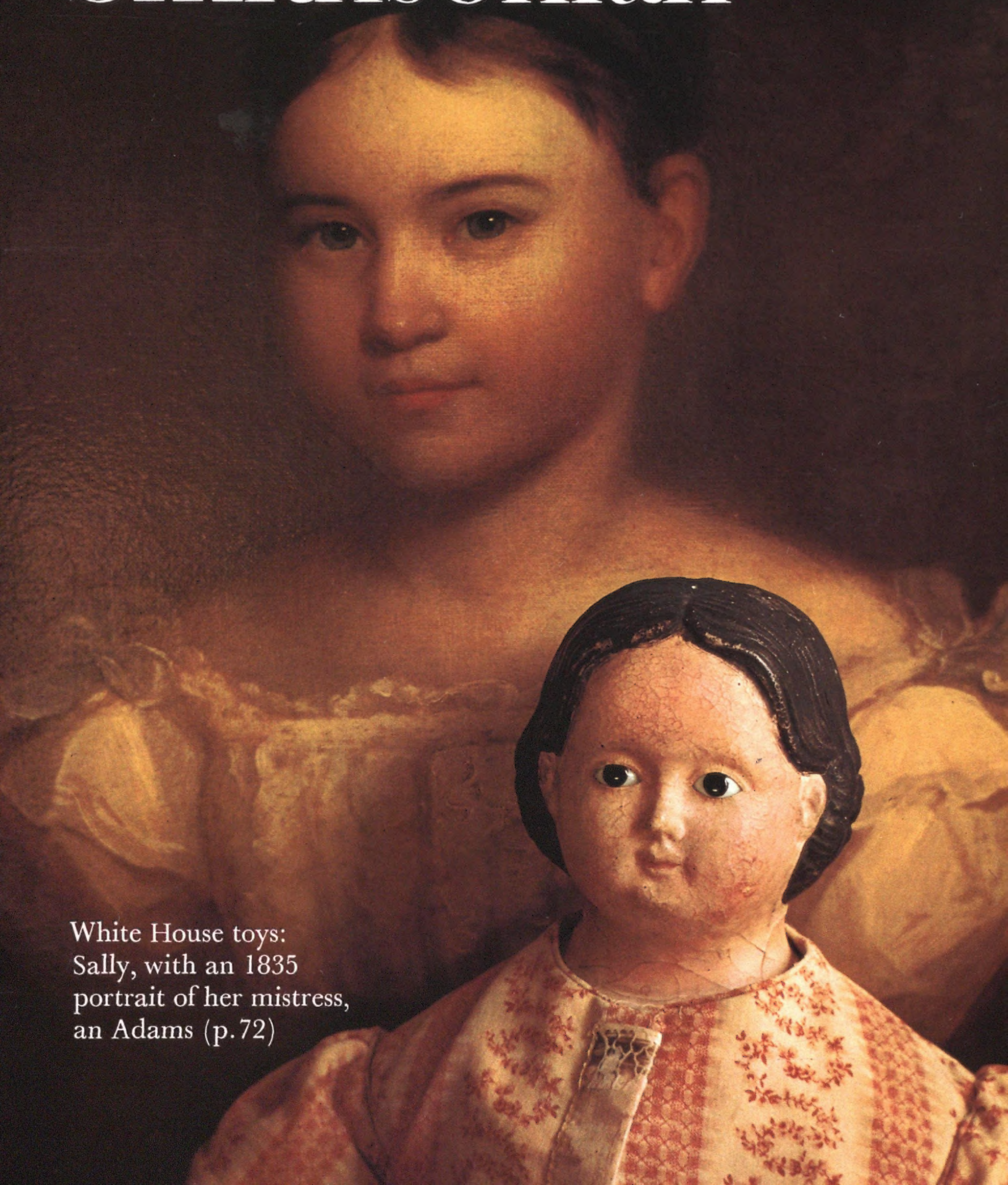
December 1973

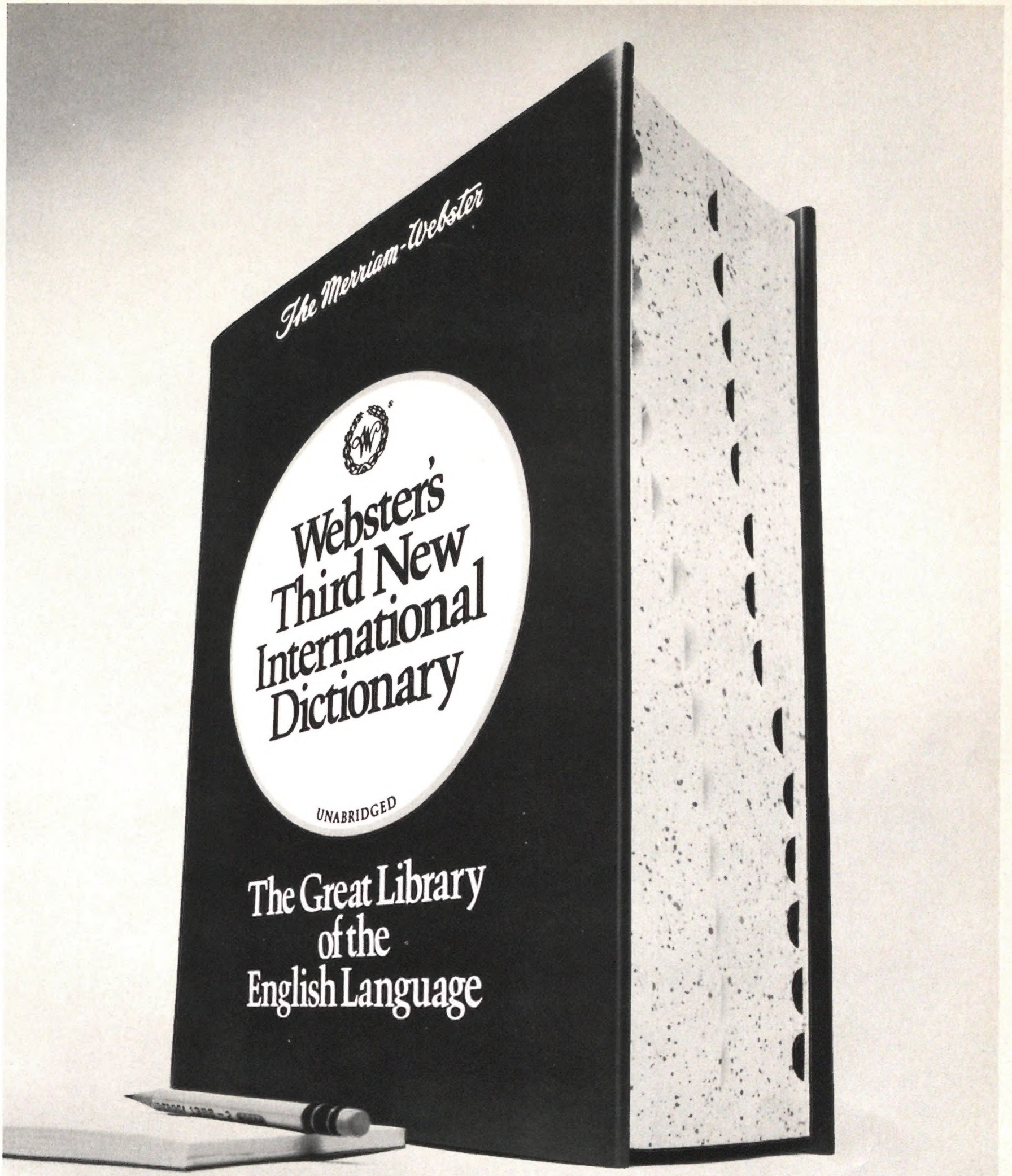
Smithsonian



White House toys:
Sally, with an 1835
portrait of her mistress,
an Adams (p. 72)

Joy to thyself.

ABOUT $10 A FIFTH. PRICES MAY VARY ACCORDING TO STATE AND LOCAL TAXES. 12 YEAR OLD BLENDED SCOTCH WHISKY. 86.8 PROOF. BOTTLED IN SCOTLAND. IMPORTED BY SOMERSET IMPORTERS, LTD., N.Y.



The gift that un-boggles the mind.

It's Webster's Third New International Dictionary. The great unabridged library of the English Language. And one of the greatest gifts you can give.

It has over 462,000 entries, 200,000 usage examples, over 3,000 illustrations, 20 pages of magnificent full-color reproductions and more than 1,000 synonym articles. In a single volume it defines the English Language as it is written and spoken today.

An unusually fine gift. $54.50. Wherever books are sold.

Merriam-Webster Dictionaries, Springfield, Massachusetts 01101.

REYNOLDS ALUMINUM
METAL RECYCLING CENTER
KEEP AMERICA BEAUTIFUL
Reynolds
Aluminum
Recycling
Center
SGD·691

...and the cans keep marching in.

Started in 1967, Reynolds Aluminum Recycling programs are still growing, helping save energy and resources, reduce litter and solid waste.

Last year, Reynolds recycled more used aluminum cans than ever before . . . nearly a billion cans, or 35 million pounds of aluminum; and we've learned that these programs do more than collect scrap. Aluminum recycling also:

1. encourages people to do something about litter
2. helps pay for programs that will turn tons of garbage into useful materials and energy
3. saves natural resources
4. conserves energy.

Big and complex jobs, but the empty aluminum can is helping to accomplish more every year.

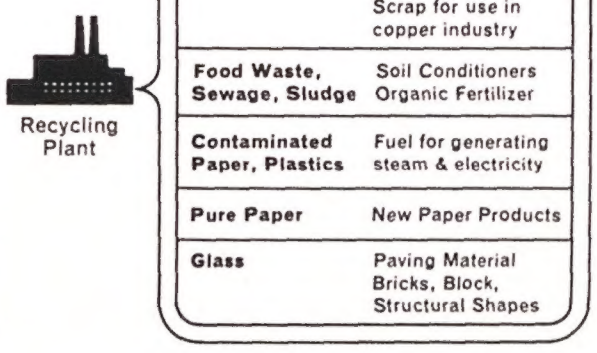
Reynolds first started recycling all-aluminum cans in 1967, so by now we have some fairly sophisticated programs in full swing. These programs prove that the principle, which we call recycling, is one effective tool in tackling many environmental problems.

The key: Aluminum's Value The key is aluminum's intrinsic, virtually indestructible value. To the consumer it is worth $200 a ton as scrap, compared to $16 or $20 a ton for other common packaging materials.

So, although aluminum makes up less than 1% of the nation's garbage, its value can pay a major share of the cost of programs that collect and reclaim other waste materials.

Getting People Involved Reynolds has found, too, that the aluminum can is a powerful incentive for people to get involved in neighborhood cleanup projects. We've been paying 10¢ a pound (about ½¢ per can) for household aluminum scrap brought to collection centers—and that offer has drawn millions of pounds back into the production system.

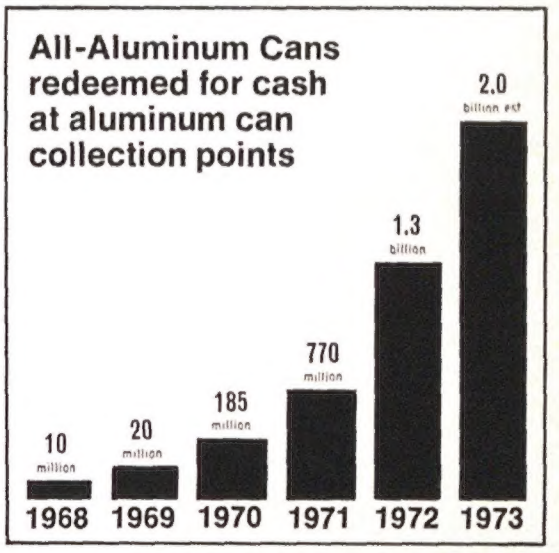
Thanks to cooperating beer and soft drink industries, there are now more than 1200 aluminum collection points in 44 states and the District of Columbia, and the program is growing. This year an estimated 2 *billion* cans will be collected.



Conserving Resources and Energy The used cans can be converted into new cans and other useful aluminum products, helping to save natural resources. And since it takes less than 1/20 of the energy to make new aluminum from scrap as compared to ore, recycling helps stretch our power supply.

Mining Municipal Waste Litter has been called just the tip of the solid waste iceberg. Reynolds has been working on the bigger "hidden" portion as well—municipal solid waste.

We've teamed with other companies and local and Federal government in the planning of soon-to-be constructed plants in several cities. These will reclaim metals, glass and other usable materials and energy from municipal refuse.



We're also working on the theory that junked automobiles will be less of a problem as more and more high-scrap-value aluminum is used in cars. We've even built a home from recycled materials to demonstrate there are vast new markets for recycled products and that recycled materials can look as good and function as well as products from virgin sources.

For details on the value of aluminum, new and old, or on any of these important projects, write Dr. R. F. Testin, Director, Environmental Planning, Reynolds Metals Company. P.O. Box 27003-LMM, Richmond, Va. 23261.

REYNOLDS
where new ideas take shape in
ALUMINUM

recyclable aluminum

Pitch In!

Secretary of the Smithsonian Institution
S. Dillon Ripley

Editor Edward K. Thompson

Board of Editors Ralph Backlund, Grayce Northcross, James K. Page jr., Edwards Park

Associate Editors David Bourdon, Marlane Liddell, Louise Smith, John P. Wiley jr.

Picture Associate Caroline Despard

Assistant Editors Donna Reifsnider, Cristine Russell

Editorial Assistant Meredith Riegle

Art Direction John Beveridge

Advertising Director Thomas H. Black

General Manager Joseph J. Bonsignore
Production Nannie Clay Shanahan
Business Carey O. Randall

Circulation-Promotion Director Anne Keating

Board of Regents
Smithsonian Institution

Ex Officio
Chief Justice of the United States
Warren E. Burger, Chancellor

Appointed by the President of the Senate
Honorable J. William Fulbright
Honorable Henry M. Jackson
Honorable Hugh Scott

Appointed by the Speaker of the House
Honorable George H. Mahon
Honorable William E. Minshall
Honorable John J. Rooney

Appointed by a Joint Resolution of Congress
Mr. John Paul Austin
Dr. John Nicholas Brown
Dr. William A. M. Burden
Dr. Robert F. Goheen
Dr. Crawford H. Greenewalt
Dr. Caryl P. Haskins
Honorable A. Leon Higginbotham jr.
Mr. Thomas J. Watson jr.
Mr. James E. Webb

National Board of the Smithsonian Associates
Mr. Lewis A. Lapham, Chairman,
Mr. Harry Hood Bassett, Mr. William Blackie,
Mr. John W. Brooks, Mr. Richard P. Cooley,
Mr. Joseph F. Cullman 3rd, Mr. Harry B. Cunningham,
Mr. Paul L. Davies, Mr. Leonard K. Firestone,
Mr. Charles T. Fisher III, Mr. G. Keith Funston,
Mr. Alfred C. Glassell jr., Mrs. David L. Guyer,
Mr. Ben W. Heineman, Mr. Henry J. Heinz II,
Mr. William A. Hewitt, Mr. Frank Y. Larkin,
Hon. George C. McGhee, Mrs. Robert S. McNamara,
Dr. Ruben F. Mettler, Mr. Roger Milliken,
Mr. Charles M. Pigott, Mrs. Malcolm Price,
Mr. Francis C. Rooney jr., Mr. Merritt K. Ruddock,
Mr. Thomas J. Watson jr., Mr. James O. Wright

Smithsonian is published monthly by the Smithsonian Associates, 900 Jefferson Drive, Washington, D.C. 20560. © Smithsonian Institution 1973. All rights reserved. Reproduction in whole or in part without permission is prohibited. Subscription price $10 a year in U.S. and possessions, $11.50 elsewhere. Single copy price $1.00. Second class postage paid at Washington, D.C. Editorial offices, 900 Jefferson Drive, Washington, D.C. 20560. Advertising and circulation offices at 420 Lexington Ave., New York, New York 10017. Please address all subscription correspondence and change of address information to P.O. Box 2606 Greenwich, Conn. 06830

December 1973

Smithsonian

Volume 4, Number 9

Table of Contents

Cover: White House toys of yesteryear include the doll Sally, posed here in front of an 1835 portrait of her mistress, Mary Louisa Adams—granddaughter of President John Quincy Adams (pp. 72-78)
Photograph by Nina Leen

6 The view from the castle: Secretary Ripley, on his fourth trip to study birds in Bhutan, tells of obstacles to travel in this remote Himalayan area

11 Phenomena, comment and notes: Plastic grass and football injuries, Ping-Pong status of pandas, lions dethroned and leadership among goats

16 A Bicentennial reminder from 200 years ago: Boston steeps 340 chests of tea in harbor waters

20 Letters to the Editor

26 A California city with 20,000 earthquakes a year comes to terms with the fault that is tearing it apart
By Joseph E. Brown
Color photographs by Jon Brenneis

34 Comet Kohoutek is about to shine
Paintings by Helmut K. Wimmer

38 Meet Mr. Carritt, master sleuth of the art world, who has an uncanny talent for rediscovering old masters
By Maureen Green

48 Brand-new look for the shape of the States

53 Left and right are more than marching orders—they affect baseball players, the brain hemispheres and vines
By Daniel Jack Chasan, drawings by John Huehnergarth

60 Yugoslavs are restoring Diocletian's Palace to make it a living part of a modern city inside its walls
By Claire Sterling
Photographs by Yoichi Okamoto

72 Playthings of Presidential offspring, now scattered, indicate happy moments in the lives of famous children
Photographs by Nina Leen, text by Peggy Thomson

80 Some 600 species of birds abound in remote Bhutan, an avian stopover seen by few ornithologists
By S. Dillon Ripley

88 World-shaking week in December—when the work in a quiet lab in Berlin and a walk in the snow in Sweden opened up the Pandora's box of fission
By Kurt R. Stehling

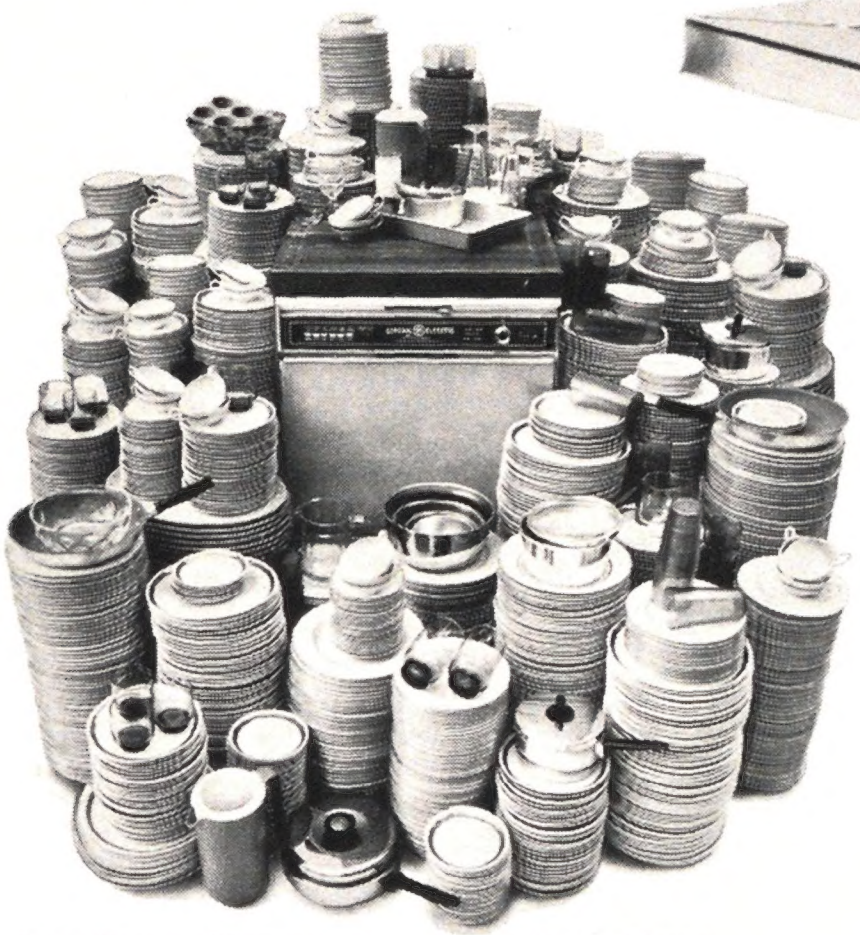
100 Book reviews

110 December events at the Smithsonian

116 An evil eye turneth away a left hook?
By Patrick Ryan

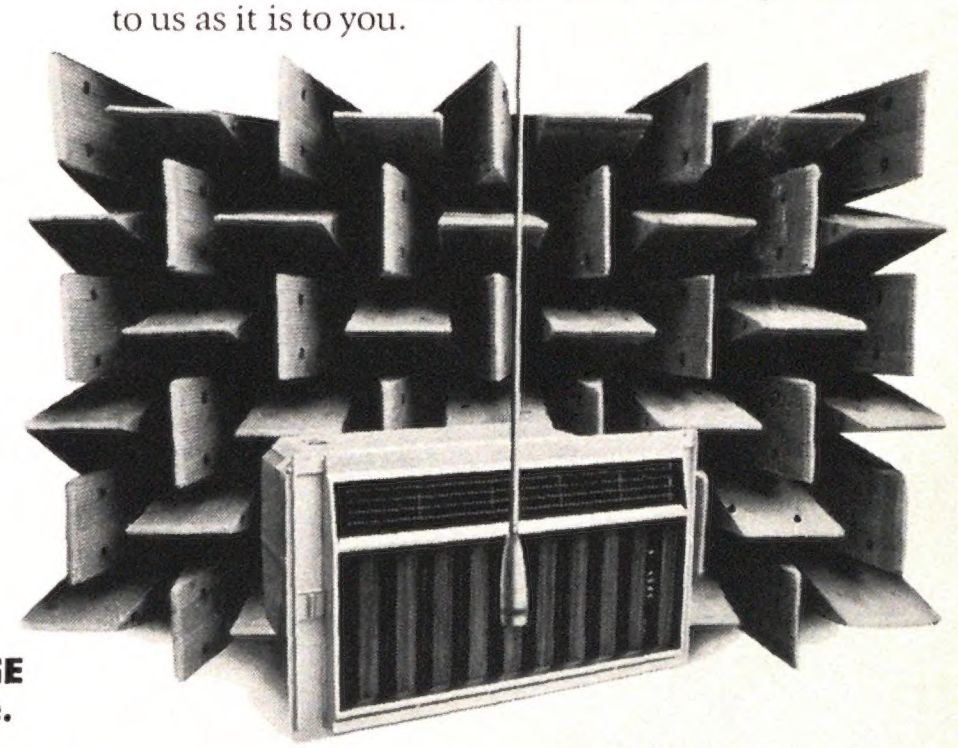
GE major appliances are built for the years you use them not just the day you buy them.

Product testing that's rougher than kids.
Before a major appliance goes into production, it has to pass a battery of torture tests. We drop steel balls onto tempered glass refrigerator shelves. We open and close the door probably twice as much as most people would in 20 years. Because if anything does go wrong, we try to have it happen to us, rather than to you.



Imagine washing a load of dishes 11,000 times.
That's only one of the tests we give our dishwashers before they're approved for production. If it can stand up to this treatment in our factory, imagine how it will stand up in your home.

A good appliance is built to be seen and not heard.
That's why we have sound absorption rooms where every sound can be isolated and identified. If we find any unwanted noise, we redesign the machine to eliminate or minimize it before we go into production. That's how we tested our Slumber Line air conditioners so they'd be ideal for bedroom use. In short, the quiet operation of a General Electric major appliance is as important to us as it is to you.



GE gives you Customer Care...Service Everywhere.™
This is our pledge that wherever you are or go in the U.S.A., you'll find a qualified General Electric serviceman nearby. Should you ever need him.

Good Service...another reason why GE is America's #1 major appliance value.

GENERAL ELECTRIC

Secretary Ripley's comments

The view from the castle

A chance to study the arduous migration of birds over the Himalayas calls to mind some obstacles to modern travel

"One ought to see everything that one has a chance of seeing," wrote Sard Harker, a philosopher of sorts, "because in life not many have one chance and none has two." Earlier this year I wrote of how important it is for a scientist caught up in administration to keep up scientific research. Now the chance has come to return to Bhutan in the Himalayas for the fourth time and once again to study fall bird migration (see pp. 80-87), and we are taking it.

We have been up to the attic to get out the old duffel bags, boots, warm shirts and camp things. They all have the special moldy odor of silverfish and the damp smell of old jute sacking reminiscent of warehouses in Calcutta. Even the moth flakes don't disguise that olfactory experience. My heart sinks.

Is it all going to be worth it? Packing, unpacking, opening crates and boxes, putting away crates and boxes; the enforced tidiness that comes of living out of duffel bags where everything is always at the bottom; the laborious day-to-day strategems of dealing with wet tents, soggy food, language problems, the cold—and, of course, the heat and the red tape in Calcutta en route. Why not just stay home? It's so much nicer to wake up in your own bed and to have breakfast at home (even if you've had to give up bacon).

And yet, if I can just climb high up on a 12,000-foot ridge, and if, in the moments when the clouds have cleared, I can see and count the warblers and finches flying over and the hawks flying above them, I may accomplish something.

Getting there is the problem. All the travel preparations are more difficult every year. Americans traveling in so-called campers don't seem to care about stout tents at all. Or, alongside his automobile and charcoal broiler, the American vacationer today may pitch a sort of Arabian tent with a big awning that stretches out in front. It should be held up with tasseled spears instead of aluminum poles that bend out of shape after the 15th setting-up.

The only stout tents you can readily find are for backpackers and they are the size of small cocoons—no good for those of us who want to sit down at a worktable on camp chairs with backs near a lamp and work half the night writing, measuring and skinning birds, pinning insects into boxes and labeling bottles of alcohol with bugs in them. We need lamps, stoves and real space.

It is also curious that in the old days of steamer travel, such things as passports, visas, inoculation certificates and entry and exit permits were all easier to arrange, if you needed them at all. You could travel anywhere in the old days with a minimum of that kind of inconvenience. Now we have jets—and customs, searches, regulations and an assortment of other obstacles. It is all much more difficult. I'm not speaking about packaged tours, of course, but of *travel*, to go and camp out on a mountain in a remote country.

In another 20 years, I suppose, no one will travel to a Himalayan ridge anymore; the birds will just whistle in the wind and the rain without anyone knowing or caring. Maybe Harker was right. Maybe there is no second chance.

S. Dillon Ripley

A report on equal opportunity employment policies and practices at General Motors.

In General Motors we have coupled our commitment to equal opportunity with extensive programs of training and development. Their purpose is to enable our employes—minorities, women and others—to take better advantage of the opportunities which await them in our organization.

One of our difficulties in recruiting more minority employes and women is that many of GM's white-collar jobs require some engineering and technical training. Traditionally, however, few minorities or women have studied engineering. So, even as we recruit intensively at institutions with engineering and technical curricula, including predominantly black and women's colleges, we must take other, more direct, steps to qualify more minorities and women for engineering jobs.

For example: General Motors maintains and operates a five-year cooperative engineering college: the General Motors Institute in Flint, where today 3,000 students are earning degrees, most of them in engineering and industrial administration. They alternate periods of study at the Institute with paid work assignments at GM divisions. One of the great advantages of the GMI system is that its graduates are assured good management or professional jobs and an opportunity to progress at General Motors. The entrance requirements at GMI are stiff. They compare with those at the best engineering schools in the country. A pre-freshman program has been established to qualify applicants who were not able to receive adequate preparation for engineering studies in high school. Currently, 88 minority students and 31 women are in this program. This is paying off in the number of minority and women students at GMI. Eight

years ago we had only 13 minority students at GMI. Two years ago we had 167. This year we have 412.

There are relatively few women graduate engineers. Last year, for example, in the entire United States only 493 bachelor degrees in engineering were conferred upon women. They represented 1.1% of the total bachelor degrees earned in engineering during 1972.

Last year 112 women were enrolled at GMI. This fall, there are 247 women, 8.3% of the total GMI enrollment.

We expect—indeed we know—that these young men and women will be among the managers of General Motors in the years to come. All that is needed is their continued efforts, our continued resolve, and time.

Several programs have been established throughout the Corporation to assist employes who may wish to continue their formal education. GM has a Tuition Refund Plan and a Graduate Fellowship Plan which last year refunded $2.9 million to employes who completed courses in recognized educational institutions. And we place special emphasis on increasing the number of minority and women employes in skilled trades. Pre-apprentice training programs at many GM plants develop the technical skills of prospective candidates for skilled-trade apprenticeships.

By such efforts, we are making long strides in short time. We are bringing minorities and women into General Motors, placing them in the mainstream of opportunity, and training, educating, and preparing them for higher positions. Our goal is nothing short of full equality of opportunity throughout our organization—and we are moving toward this goal.

Several years ago we made a significant shift in our thinking. We had always been against discrimination, but we decided then that just to be *against* was no longer enough. We chose a more positive, more affirmative role. We committed the Corporation to work not only to prevent discrimination, but to promote equal opportunity in employment. Then, and since then, we have made it very plain that it is the continuing policy of General Motors to provide equal opportunity for every American in every area of our business.

We are convinced that this policy—positive rather than negative, active rather than passive—is the right one. It is right because it not only fulfills the let-

ter of the law, but reaches to the spirit of our American commitment to equality.

Our record at General Motors has a special quality enhanced by GM's tradition of success. General Motors is successful because it applies rigid standards for advancement to all employes. The rewards and incentives are high, and so are the standards of performance necessary to achieve them. When an employe progresses in General Motors, he or she can be sure that recognition has been earned. Everyone who knows General Motors knows this is so.

Here are a few figures. The percentage of minority employment in GM grew from 11.2% of our U.S. work force in 1965 to 16.7% by the end of 1972. And since then, the 16.7% has climbed to over 17%.

This is progress, and significantly the gains of minorities in white-collar jobs have been more rapid. Minority Americans in these jobs increased from 1.7% in 1965 to about 4.7% in 1971. Just a year later, the 4.7% became 7.1%, and today the percentage of minority employes with white-collar jobs in General Motors is over 8.4%.

In 1965, women accounted for 12.9% of our work force. By December 1972, the number had increased to 13.9%, and today the percentage of women in the GM work force is 15.1%. Of the managers, technicians and professionals at GM in 1965, eleven hundred were women. By the end of 1971, the number had increased to 1600, and as of the end of last year the number was 2800. And since then, it has climbed to 3900.

Percentages and numbers are cold, but these represent in General Motors 113,000 minority Americans and 97,000 women earning for themselves and their families the employment opportunity they deserve. They are more than numbers—they are real human stories—over 210,000 of them. And the number is growing every day.

And every job in General Motors, white-collar or blue-collar, is a good job. The average hourly employe who works in our plants earns more than $12,500. Their wages alone—not counting fringes—place these employes in at least the upper one-fourth income bracket in the United States.

We know that equal opportunity in employment is not up to the employe alone. The person who does the hiring and the promoting is crucial. So we train not only employes, but we train mana-

gers as well. We teach them how to take positive action to speed upward mobility throughout the Corporation.

In January 1972, this message was given to our Personnel Directors: "As you are all aware, the policy of General Motors Corporation is that everyone will be given an equal opportunity in employment without regard to his or her race, religion, or national origin. This is the policy of General Motors, and every member of management must implement this policy.

"Now, there may be many personal prejudices in connection with this problem. These are being expressed in different ways throughout the country, and each person is entitled to his own opinion. However, the position of GM in these matters is unmistakably clear: there is no room for prejudice in General Motors —and we mean just that. If we have any person at management level in any GM facility who cannot function within this policy, or is not giving it full attention, then he will simply no longer be able to work for General Motors."

We are making progress, but the effort is hard. Progress does not come easily. It requires hard work and dogged dedication—day after day. But it is worth the effort. Minorities and women in General Motors are earning their way to economic equality, gaining—day by difficult day. They are getting there—surely. A number of minorities and women are now in top positions. Hundreds more are just below them, and thousands more a level down, and throughout the Corporation there are more than a hundred and thirteen thousand minority Americans and ninety-seven thousand women—all working, all earning opportunity.

No one can doubt the commitment of General Motors to full employment equality. Neither should anyone doubt the certainty of its eventual achievement.

GM cares about cars. GM cares about people too.

★ ★ ★ ★ ★

General Motors

Phenomena, comment and notes

Plastic grass and football injuries, pandas as Ping-Pong balls, lions dethroned and leaders among goats

Are leaders born or are they made? Does the dominant member of a group (be it a wolf pack or a bridge club) owe its status to genetic inheritance or to the lessons of experience? Animal behaviorists have argued the question for decades, using detailed observations on everything from red deer to tropical fish as debating points. Among the latest to be volunteered for the fray are goats.

Two zoologists at Duke University,

Kids play king of the mountain on a board. Do mothers determine who wins?

P. H. and M. S. Klopfer, wondered if the relations between newborn kids and their mothers might explain the later appearance of domineering behavior. In what turned out to be a surprisingly complicated analysis, the Klopfers said no, goat leaders are probably born, not made. But status among goats can switch around depending on which goatish activity is being engaged in. And, further, the Klopfers warn against extrapolating from one sort of animal (such as goats) to another (such as Man).

Then why study goats? Explaining themselves in *American Scientist* with candor rare in such reports, the Klopfers find "goats delightful companions! Perhaps this is our most important justification for studying them." And if dominance isn't teachable, enthusiasm apparently is. The Klopfers' study was done with the assistance of what is surely a one-of-a-kind organization: the Duke University Goat Watching Society.

Don't laugh. Konrad Lorenz just won one-third of a Nobel Prize for associating with geese.

Looking before you leap

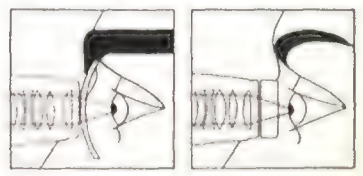
What could be more annoying than having the telephone ring when you are in the shower? Having a videophone do the same thing.

Such a situation seemed likely a few years ago, given the inexorable inventiveness of the communications industry. But then prudish bathers got a reprieve as the telephone people began seeing a better market in producing high-resolution scanning devices for transmitting documents by phone, rather than low-resolution devices for transmitting animation (*i.e.*, a bather scrambling for a robe). Now, according to *New Scientist,* the likelihood is that both techniques will be included in the same device and it is possible that, if society decides to make the huge investment necessary, such a system could be common in 20 years.

The implications for society could be vast and far-reaching. According to a Cornell University study, there would probably be a large-scale decentralization of office facilities. This would in turn affect transportation. While rush-hour traffic jams would be reduced, planners would also have to realize that the highly expensive mass transit systems they envision could be rendered obsolete almost as they open up for business. Air travel might be cut nearly by half. Energy savings would be great: The power equivalent of a gallon of gas "will provide 66 hours of conversation on Picturephone."

Why the thin one is best for eyeglass wearers.

Compact, lightweight Leitz Trinovid® binoculars provide full-field viewing with no need to remove your glasses.



Trinovid's exit pupil (the point where the light rays converge) is further than usual from the eyepiece. Rubber eyecups compensate for differences in eye-relief factor: with glasses (left) eyecups are folded back; without glasses (right) they are extended. In both cases the same large exit pupil is produced.

Each hand-assembled unit is perfectly aligned to prevent eyestrain. Their superb Leitz optics are color-corrected and anti-reflection coated. The "roof prism" design and internal focusing make it possible to seal and protect all elements in an extremely thin but unusually sturdy unit.

Trinovids are about twice as expensive as conventional glasses. But they are the only binoculars that offer the original owner a lifetime guarantee. (In case of a defect return the unit postpaid and Leitz will either repair or replace it at our option.)

And if you consider binoculars as an extension of your own precious optical system, buying less than the best is an unwise economy.

For a brochure write E. Leitz, Inc., Rockleigh, New Jersey 07646.

Leitz

The only binoculars with a lifetime guarantee.

Wanted: People willing to invest $668 each in Ancient Inca ruins. (Photography permitted.)

For more information contact The Red Baron.

See Lima, Cuzco, Machu Picchu, the Islands of the Sun and Moon and Lake Titicaca. Nonstop daytime Lufthansa jet flights between New York and Lima, deluxe or superior first-class accommodations, most meals, guides and local transportation will be provided. For this one-week and other tours to South America write for free prospectus. And remember, you can use your American Express Money Card to pay for your trip.

The Red Baron
Lufthansa German Airlines, Dept.
1640 Hempstead Tpke. SMSS1200
East Meadow, N.Y. 11554

Please send me your booklet "South America Holidays" (117) with details of all your tour itineraries in South America. I understand the price is based on round-trip GIT air fare, economy class, double occupancy.

Name_____
Address_____
City_____ State_____
My Travel Agent is_____

Lufthansa German Airlines
Fly with The Baron.
He knows how to travel.

Most technology assessors must think on the grand scale in their analyses of social impact, but society is made up of people and personal impacts are worth considering. Traditions would fall. Office parties by videophone? What would happen to the business lunch, along with the bistros that survive on them? Would houses need redesigning once both husbands and wives ended up working, day-in, day-out, by videophone at home together—or would this strengthen what's left of the American family?

Even less basic upheavals in the social fabric are worth considering. For example, *New Scientist* asks, "Will the videophone add a new dimension to the obscene telephone call?"

Elsa the moocher

A whole lot of bad news for people who get sentimental about lions has been summarized recently in the *New York Times Magazine*. Mainly from the work of zoologist George Schaller it has become evident that lions are not the kings of anything. They do as much scavenging as hunting and they are clumsy killers; hyenas and wild dogs, generally despised as thieving scavengers, are actually more efficient predators than lions. Schaller has caught lions in the act of cannibalism and also in maternal infanticide, not to mention neglect.

And dewy-eyed followers of the exploits of Elsa are in for a shock. She never made it as a wild and free lion at all. The *Times* alleges that after she was released in the Serengeti, the Adamsons felt it necessary to spend a lot of time shooting game outside the park to provide her with handouts. At best, she became a kind of leonine pigeon. As for her forever-free cubs, one of them went too wild, killed a man and was shot for it.

Science in football

Besides lack of talent and bad coaching, one thing that can keep a football team out of the Superbowl is injuries and one thing most car-pool quarterbacks (and a lot of players) are sure of is that synthetic turf, first used professionally in Houston's Astrodome, causes injuries. Others, including many team owners, disagree. Science is bearing down on this matter, according to *Medical World News,* but the final gun is yet to sound.

A five-year study of more than 2,000 professionals indicates that "football players who wore stubby-cleated shoes on artificial turf had fewer injuries than those who wore either stubby-cleated shoes or conventional football cleats on natural turf."

While an average of 2.7 injuries occur per game on plastic grass and only two per game on natural turf, most serious injuries to knees and ankles occurred on natural turf. All this directly contradicts an earlier study of the same problem and so the debate continues. (It is interesting to note that players falling down on plastic grass are prone to brush burns that often result in penicillin-resistant staph infections.)

In a related matter, one thing is fairly clear for those willing to submit themselves or their sons to the ongoing orthopedic experiment called football: To wear old-fashioned football cleats on natural turf is to ask for a knee injury. Anyone doing so, says *Medical World News,* "is almost literally nailed to the ground."

Taxo-tennis

The first Western naturalist to see a giant panda thought it was a kind of bear; the next one placed it among the raccoon family. And for the last century the giant panda has been bounced from one family to the other, a black-and-white Ping-Pong ball of taxonomy.

The latest volley—as decisively delivered as a forehand smash—is from Vincent M. Sarich, of the University of California at Berkeley, who uncompromisingly asserts that giant pandas are bears. His opinion, in *Nature,* is based on analysis of certain characteristics of serum proteins from the blood of the late Chi-Chi of London. These blood proteins mutate at a known rate, it is believed, therefore providing a kind of clock to help trace the evolutionary paths of various species. As measured in Berkeley, panda blood is no farther from bears' than dog blood is from foxes'. Also, it's quite far from the blood of raccoons.

Prior to the appearance of Sarich's findings, Chinese zoologists (and those at the Smithsonian's National Zoological Park) had taken the position that pandas —the giant kind and the lesser-known lesser pandas—form a taxonomic family of their own. What of the new findings? "If you take all this blood serum business

Six Great Sherries. One Great Name. Duff Gordon.

If you're a Sherry drinker, you know that the Duff Gordon name means great Sherry. It has meant that since 1768.

Today, the Duff Gordon name lives on in six great Sherries ranging from very sweet to very dry. Santa Maria Cream. No. 28. Nina. El Cid. Club Dry Amontillado. And Pinta.

So no matter what your taste may be in Sherry there's a Duff Gordon Sherry that will suit your taste.

Duff Gordon. Six great Sherries. One great name.

Duff Gordon Sherries

Sole Importer U.S.A. Munson Shaw Co., N.Y.C.

The Father of All Scotch

Now you can enjoy the true taste of Scotch as Scotch began:

The Unblended Taste of the Original.
The Glenlivet 12-year-old.

In 1824, when all Scotch was straight, unblended Scotch, The Glenlivet became the first distillery in Scotland granted a government permit to distill. Since then, its consistency, purity of flavor, delicate bouquet, mellow body and subtle lightness have made it prized above all.

The Light Heart
of All Great Blends.

If your favorite 12-year-old Scotch has "blended" on its label, you may already have had a hint of us.

For we're in most of them, including Chivas Regal.

But now, in limited quantity and at a premium price, The Glenlivet will be available on its own.

The Glenlivet

86 Proof, unblended Scotch Whisky, Imported from Scotland by The Summit Marketing Co., New York, N.Y. 10022

too seriously," says a recently interviewed National Zoo researcher, "then you've also got orangutans in the same family as Man.

"Taxonomists don't really have a good definition of family; it's just a category to put a whole lot of genera in. And furthermore, what's a bear?"

Pong. The game goes on.

Thinking big

Practically every time you turn your back, someone comes up with another scheme for generating power. To those of us who can only barely remember the several laws of thermodynamics, much less trace their implications through an engineering plan, it is difficult to know how to react to such ideas.

In any event, one of the latest is to take advantage of the fact that here and there near land, seawater is 75 to 85 degrees F at the surface and about 40 degrees F some 3,000 feet below. A natural setup for a heat pump, except that most efficient heat pumps call for a much greater difference in temperature.

As described in *Science,* by Donald F. Othmer of Brooklyn's Polytechnic Institute and Oswald A. Roels of Columbia University, the way you use this natural windfall is with what they candidly describe as a huge, expensive and inefficient plant. The cold water would be sucked upward and used to cool warm surface water. The result, we are assured, would be enough low-pressure steam to turn a turbine to produce electricity.

As the steam cools, it condenses and you have a valuable by-product—fresh water. *And,* as the cool water from the depths warms up, you have yet another by-product: Full of nutrients but free of pest organisms, the originally cold but now warm water is perfect for growing acres of shellfish. And if *that* isn't enough, the scientists predict that the effluents of the shellfish would enhance the farming of certain seaweeds from which you can obtain carrageen, a substance used to make (among other things) blancmange which, persistent and by now breathless pursuit in the dictionary taught this reporter, is a dessert. Thus you have what might be called an instant conglomerate.

There's simply no telling where this energy crisis will lead.

JAMES K. PAGE JR.

For the complete Kaiser color brochure, and name of nearest dealer, kindly remit 25¢ to EBELING & REUSS CO., Dept. SM., 1041 W. Valley Rd., Box 189, Devon, Pa. 19333

Waste Watcher Israel Proler— he collects steel cans by the millions

Israel Proler is one of America's new breed of waste watchers. The Chairman of Texas-based Proler International Corp., he is concerned about America's environmental shape. And he is doing something about it by reclaiming everything from junked autos to used tin cans.

Hundreds of millions of tin cans are magnetically reclaimed each year from municipal garbage and then processed in Proler plants. Along with thousands of tons of scrap from canmaking lines, the used cans are then shipped to Arizona and New Mexico. There they are used as "precipitation iron" in a chemical process that recovers copper from low-grade ore.

Israel Proler is on the prowl for used steel cans which can be economically handled by his plants. The nation's copper mines can use an estimated 10-billion annually.

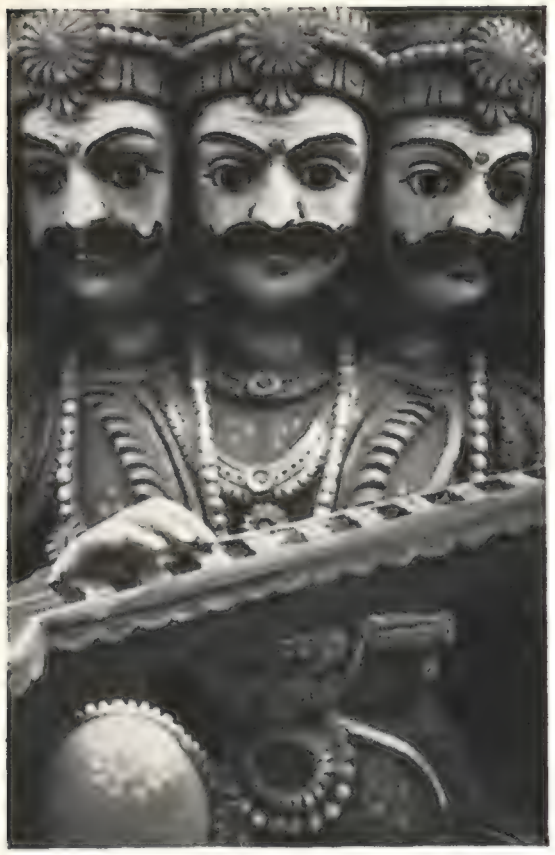
Reclaimed steel cans also are recycled by the steel industry, detinning plants and ferroalloy producers.

Mr. Proler and other waste watchers are reclaiming 3 billion steel cans in 20 cities by magnetic separation—the leading resource recovery system. Steel's unique magnetic property makes it possible.

If you would like to know more about "waste watching," write to: Tinplate Producers, American Iron and Steel Institute, 150 East 42nd Street, New York, New York 10017.

Steel the recycled material

Tinplate Producers American Iron and Steel Institute



200 years ago this month

Boston steeps 340 chests of tea in the harbor

DECEMBER 1773

"The tea that baneful weed, is arrived," writes Abigail Adams to her friend Mercy Warren on the fifth of this month. "Great and I hope effectual opposition has been made to the landing of it. . . . I tremble when I think what may be the direful consequences, and in this town must the scene of the action lie. My heart beats at every whistle I hear, and I dare not express half my fears."

Even as John Adams' wife pens her letter, the ships *Dartmouth* and *Eleanor* lie in Boston Harbor, the brig *Beaver* is on her way and tension is steadily mounting along the cold, cobbled streets. By law, customs officials must collect their duty 20 days after a cargo arrives in port. Time will run out on *Dartmouth*'s tea cargo December 17. If it is not unloaded by then, it will be seized by customs, the duty paid and the dearly held principle that Colonists need not pay the mother country's taxes will fail in its testing.

News comes that *Beaver* has smallpox aboard and must be scoured and smoked before making port. The second brig, *William,* runs aground on Cape Cod.

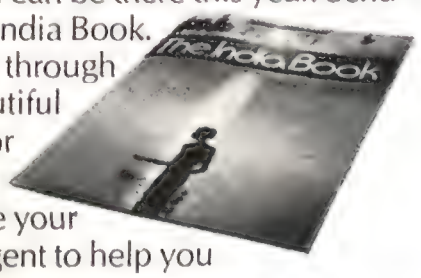
Thursday the 16th brings cold, rainy weather. Yet thousands of citizens leave their firesides to jam once more into the Old South Meeting House.

Our free book of tours to India will free you from another ordinary trip to another ordinary place.

The India Book is a gift to you from Air-India. It's filled with extraordinary tours of an extraordinary land.

The tours in The India Book are as different as India is. Whatever the duration of your stay, price range or special interest, there's a special tour for you in The India Book.

You can be there this year. Send for The India Book. Wander through the beautiful full-color photos. Then see your travel agent to help you with your arrangements.



AIR-INDIA
666 Fifth Ave., N.Y., N.Y. 10019
Yes! I'd love a free copy of The India Book. SM-12

Name

Address

City

State, Zip

We work all day to make your night with us a dream.

Francis Rotch, son of *Dartmouth*'s owner, has traveled out to Milton to confer with the obdurate Royal Governor, Thomas Hutchinson. Rotch wants to save his ship and cargo. Will the governor grant *Dartmouth* a clearance to leave Boston? The governor will not.

Rotch returns to Old South to make his report. It is late by the time he arrives, and candles gutter above the restless throng. His news is greeted by hoots, but someone calls out to leave Rotch alone: He is an honest man, doing all he can.

Will he then sail back to England, his tea unloaded? The question from the floor brings sudden silence.

Nay, by law he cannot return the cargo and it would rot in his hold.

Will he try to unload it here in Boston?

If so ordered by law, he will.

Sam Adams, quietly supervising the assembly, rises: "This meeting can do nothing more to save the country."

Apparently it is a signal, for scattered war whoops echo in the murky hall. Then with a rush of feet the room empties; the mob outside catches the fever, and there is a surge toward the waterfront.

Along the way, men drop off at their homes to snatch up a blanket, a few feathers, to daub their faces with soot and red paint. Then they move quietly through dark, rainy streets that smell of spices and molasses—on down to Griffin's Wharf. *Dartmouth* and *Eleanor* are tied up there; *Beaver* is anchored just off the wharf.

Bands of men—two or three score—seemingly well rehearsed and mostly wearing a few scraps of Indian garb, swarm aboard, warp the brig alongside the ships, seize the customs agents and put them ashore. The watchmen, previously posted, stand aside or join the boarders.

The rain stops and men raise the cargo hatches and, with block and tackle, hoist the heavy tea chests on deck. Then with crowbars and hatchets they smash them open and dump the tea overboard. It rises gunwale high and must be shoveled aside to make room for more, and in great drifts it gradually floats down the harbor. The crowd on shore shivers in the night cold and watches so quietly that the cracking and tearing of the chests can be heard far back from the wharf.

In all, 340 chests of tea are destroyed—worth about £9,000. In the morning, weary men show up for breakfast with smeared paint on their faces so that their children scream in half fright at Papa, and he does a mock war dance for them.

At Christmastime this year of 1773, Dr. Samuel Johnson takes time out from his work to feast and wassail in English tradition. He is exchanging letters with his young friend Boswell about their recent journey to Scotland—a fine subject, they agree, for a book. In Versailles, Marie Antoinette is offered diamond earrings through King Louis XV's mistress, Madame du Barry—not a Christmas present exactly, but a way to sweeten her image with the future queen. Marie, aged 18, scorns the 700,000-franc token.

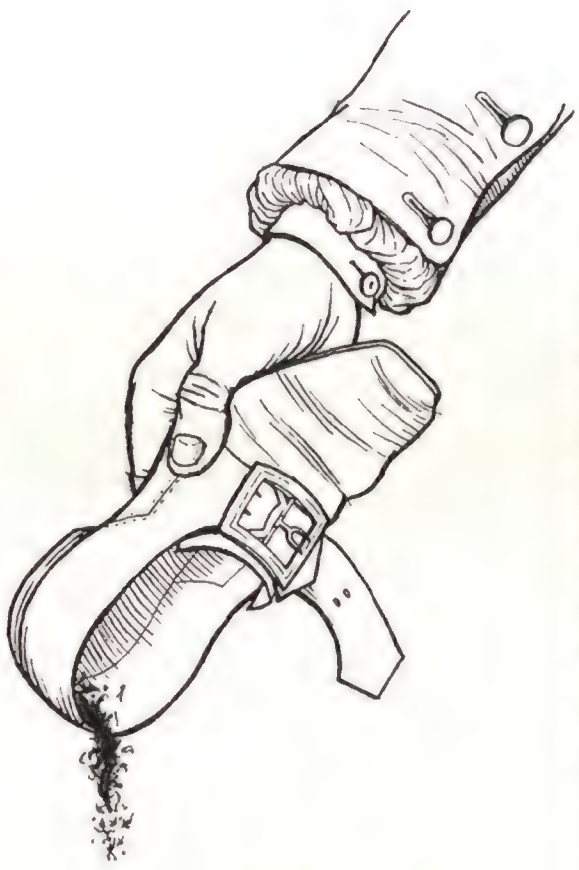
Puritan New England eschews expensive baubles—and Christmas itself. People are only concerned with the repercussions of Boston's Tea Party. Paul Revere, who took part, barely takes the time to shake loose tea out of his shoes before riding south with the news. Only in Boston has the answer to the tax been so violent. Consignees in New York and Philadelphia resigned under pressure. Charleston's tea rots in a warehouse.

Now that the party is over, a few Bostonians recall how British Admiral John Montagu leaned from a window as the mob passed the house where he was dining.

"Well, boys," he cried, "you have had a fine, pleasant evening for your Indian caper, haven't you? But mind—you have got to pay the fiddler yet."

EDWARDS PARK

Next Month: Meanwhile in London. . .



"I DON'T BELIEVE IT!

This new thing actually turns your hand into a vacuum cleaner."

Did you ever hear of such a thing? You put this thing in the palm of your hand—and wherever you place your hand it picks up dirt, lint, crumbs just like a regular vacuum cleaner. Actually turns your hand into a vacuum cleaner. Perfect new appliance for picking up dirt on sofas, drapes, car seats, desk tops—does a fantastic job crumbing the dinner table. Great for billiard table.

Weighs about 10 ounces. Works like a regular sized vacuum cleaner. Has a brush to pick up dirt. Good suction. No bag to empty—just remove top—and empty, the way you would an ashtray.

Works on two regular batteries, which are included. A beautifully built appliance, in bright orange. You'll wonder how you passed Monday without it. Money back if not pleased. $9.95 complete.

Wallace Brown SINCE 1922

5246C

Westmoreland Avenue, White Plains, N.Y. 10606

MAIL NO-RISK COUPON TODAY

WALLACE BROWN, Dept. TVC-51
Westmoreland Ave., White Plains, N.Y. 10606

Please send me the following Hand Vacuum Cleaner(s) with full money-back guarantee if I am not delighted.

☐ One for $9.95 ☐ Two for $18.95

Add $1.00 postage and handling for each.

New York State residents please add appropriate sales tax.

Enclosed is ☐ Check for $_____

☐ Money Order for $_____

or charge my ☐ Master Charge ☐ BankAmericard ☐ American Express

Card Number_____ Exp. Date_____

Interbank # (Master Charge only)_____

Signature_____

Name (please print)_____

Address_____ Apt. No._____

City_____ State_____ Zip_____

DIVISION OF BEVIS INDUSTRIES, INC.

TIME LIFE RECORDS

From Bach to Bernstein—experience and appreciate

Discover the secret of enjoying great music through this absorbing TIME-LIFE RECORDS series of outstanding musical works—complete with illustrated booklets of historical background, specially written program notes, and a lifetime collection of superb recordings.

So many intelligent people who are cultivated in literature and art have never achieved an ease and familiarity with great music.

If this is true of you, it may simply be that you have never had a convenient way to be exposed to a wide range of great music . . . and that no one has ever explained to you what to listen for.

To give interested families the opportunity to become better acquainted with great music, to help them learn to listen to it with greater perception and appreciation, and to help them enjoy a deeply satisfying collection of this music in their homes, TIME-LIFE RECORDS in association with Angel Records developed this extraordinary series, THE STORY OF GREAT MUSIC.

This magnificent series will take you on a satisfying educational journey through three centuries of great music, performed by some of the most accomplished musicians of our time.

Every other month, as a subscriber, you may audition free for 10 days a set of four long-playing records, accompanied by program notes and a sparkling illustrated booklet of historical background.

You'll hear acclaimed orchestras such as The Royal Philharmonic, the Moscow Chamber Orchestra, and the Vienna Philharmonic, directed by such superb conductors as Otto Klemperer, Pierre Boulez, and Sir Thomas Beecham. You'll thrill to virtuoso performances by great artists like Yehudi Menuhin, Elisabeth Schwarzkopf, and Maria Callas. And you'll discover a depth of enjoyment in music that many people never find.

You'll hear music *From the Renaissance*, commissioned by Kings, yet often subtly used by its composers to express rebellion against them.

You'll enjoy compositions from *The Age of Elegance* when a musician's lot depended on self-indulgent patrons: please them as did Haydn, and live in luxury; offend them as did Mozart, and die a pauper.

You'll come to recognize the war sounds of *The Age of Revolution* in the works of Schubert and Beethoven—with Beethoven's music also echoing the cries of a man bitter from the pain of growing deafness.

You'll hear in the compositions of *The Romantic Era* the sound of men pouring out their souls: Chopin crying for his tragic affair with George Sand; Schumann, pining for a marriage his family opposed; the flamboyant Liszt who captured a following as frenzied as that of the Beatles.

You'll sense in more recent music the exciting winds of change . . . stirred by Wagner and Tchaikovsky in *The Opulent Era*, fanned by Debussy, Rachmaninoff and Ravel in the *Prelude to Modern Music*, and furthered by Bartok, Prokofiev and Stravinsky in *Early Twentieth Century* music. And you'll also delight in the distinctive sound of *The Spanish Style* and *The Slavic Tradition*, born in ancient folkways and expressing a historic cultural identity.

In this delightful way, you and your family can begin to build an outstanding collection of fine music—while also adding a precious extra dimension to your enjoyment and appreciation of it.

To embark on this extraordinary musical adventure, simply fill out and mail the bound-in reply card. We will send you, for a free 10-day audition in your home, the album on a momentous period in musical history: *The Baroque Era*.

Be our guest as you learn how the bold, sensuous, intense sounds of this era replaced the restraint and repose of the Renaissance. Enjoy the soaring trumpets of Bach and Handel, the brittle twang of Couperin's harpsichord, the velvet throatiness of Purcell's violins, and much more.

Then decide if you want to keep *The Baroque Era*. You may do so for the sensible price of only $14.95 ($15.95 in Canada) plus shipping and handling, or you may return it with no further obligation. If you keep *The Baroque Era*, we will send you other albums in the series as described on the reply card. There is no obligation for you to buy any of these albums and you may cancel your subscription at any time.

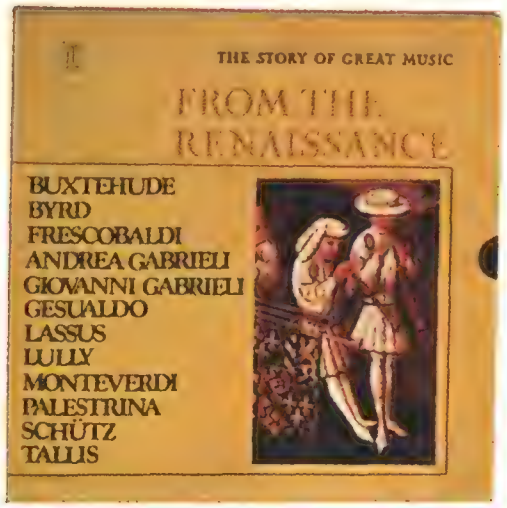
Audition "THE BAROQUE ERA" free for 10 days as an introduction to THE STORY OF GREAT MUSIC

LIKE ALL OTHER ALBUMS IN THE SERIES THIS BOXED SET CONTAINS:

A. Four LP records of music representative of the era.
B. Program notes on what to listen for in each selection, written by a seasoned musicologist.
C. A fascinating book on the historical background of the era, with rich illustrations, many in full color.
D. A handsome library-bound slipcase.

In addition, this first shipment contains an introductory booklet (**E**) "The Story of Great Music."

an exciting way to
3 centuries of great music



TIME LIFE RECORDS

TIME & LIFE BUILDING, Chicago, Illinois 60611

0621

Yes, I would like to examine *The Baroque Era*. Please send it to me for 10 days' free examination and enter my subscription to THE STORY OF GREAT MUSIC. If I decide to keep *The Baroque Era*, I will pay $14.95 ($15.95 in Canada) plus shipping and handling. I then will receive future albums in THE STORY OF GREAT MUSIC series, shipped an album at a time approximately every other month. Each is $14.95 ($15.95 in Canada) plus shipping and handling and comes on a 10-day free-examination basis. There is no minimum number of albums that I must buy, and I may cancel my subscription at any time simply by notifying you.

If I do not choose to keep *The Baroque Era*, I will return the album within 10 days, my subscription for future albums will be canceled, and I will not be under any further obligation.

*Print Name*_____

*Address*_____

*City*_____

*State*_____ *Zip*_____

Now you're talking my language.

KAHLÚA® Black Russian.
What an intriguing idea.

A mood in a glass. So simply achieved. An ounce of Kahlúa, two ounces of vodka, rocks. Perfect before or after dinner... the theatre...or anything at all.

For all manner of intriguingly different Kahlúa ideas, send for our recipe book. Our treat. Because you deserve something nice.

Kahlúa. Coffee Liqueur from Sunny Mexico. 53 Proof.
Jules Berman & Assoc., 116 No. Robertson Blvd., Los Angeles, Calif. 90048

Letters to the Editor

Architecture and energy

Dear Sir: I am impressed by the beauty of the architecture pictured in the October issue in Jane Stein's article about buildings that conserve energy.

I would be happier looking at and working in an energy-conserving building like the Tempe Municipal Building, but not if it costs too much more than the conventional alternative.

Brian E. Forst
Reston, Virginia

As the article points out, the traditional way of financing buildings is on a first-cost basis but, for longtime savings in money and energy, building designs as well as bank loans, it is argued, should be calculated in terms of overall lifetime costs. Ed.

Dear Sir: Your article cites the 110-story-high World Trade Center with its horrendous electric requirements and also pictures the spectacle of Manhattan ablaze with lights at night.

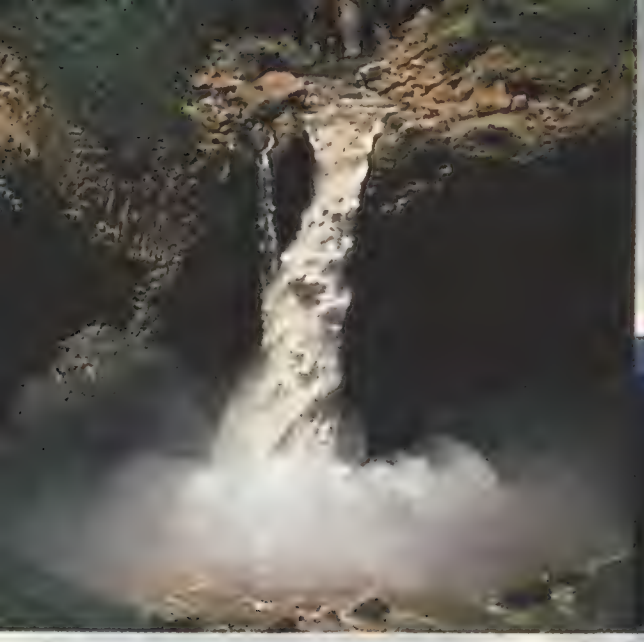
May I speak for at least some New Yorkers who are offended by the sight of the World Trade Center lit up late into the night when there is clearly no indication for the use of all that power.

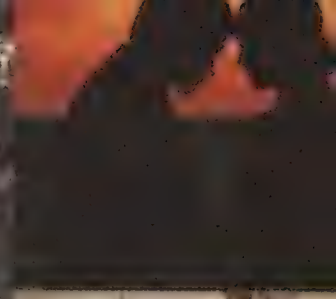
Dr. Robert C. Wallach
New York City

About the "spectacle," we also added that "it may be time to turn off some lights." Ed.

Israel Museum

Dear Sir: In his article on the Israel Museum Alfred Friendly wonders why the Shrine of the Book should have a glittering white dome. The answer lies in the





ANNOUNCING A SPECIAL 23-DAY ADVENTURE TO PLACES AS DIVERSE AS MACHU PICCHU, THE AMAZON RIVER, THE GALAPAGOS ISLANDS, THE MEXICAN RIVIERA, AND THE T.S.S. FAIRSEA.

On March 9, 1974, one of the world's great cruise ships sails from Los Angeles on a 23-day luxury cruise of unparalleled adventure. Ports of call range from the jet-set elegance of Acapulco and Puerto Vallarta to the Galapagos Islands and the Panama Canal. With a train excursion to Machu Picchu, lost city of the Incas; or a side trip to an unusual Peruvian hotel in the heart of the Amazon.

And for 23 days your home will be the T.S.S. Fairsea, where all the accommodations, activities and entertainment are first class. The Fairsea is just the right size for such a cruise, with spacious rooms, private facilities, and a charming Italian crew trained in the Continental tradition of impeccable service.

As you might guess, this unusual trip will book rather quickly. Be sure you're aboard. See your travel agent now. He'll handle the arrangements, and give you a handsome brochure describing the cruise in detail. Or write: Sitmar Cruises, 3303 Wilshire Blvd., Los Angeles, California 90010.

SITMAR CRUISES

The T.S.S. Fairsea is of Liberian registry

Fly/Drive Australia at a down under price.

$683*

AIR FARE INCLUDED

Let's get down to it:

You get your round-trip air fare to Sydney, an airport transfer upon arrival, 10 days' lodging in the Kingsgate Hyatt Hotel, Sydney. And get this: a Hertz Ford Falcon with 500 free miles (14¢ a mile after that).

We even throw in a Get Ready Kit with maps and information to help you get around.

And not only is the price right, the season's right. It's Spring now and Summer is not far behind. Trout fishing is open. Cricket is on. And the Greyhounds are off and running.

We also have other escorted and independent vacation tours to the South Pacific. And we'd like to tell you all about them, too. So give us a call at American Airlines. Or ask your Travel Agent to fill you in. Then fill in the coupon that's down under.

American Airlines, P.O. Box 1000, Bellmore, New York 11710 SM-12

Your Fly/Drive sounds like a vacation I can't afford to miss. Please send me your brochure.

Name_____

Address_____

City_____ State_____ Zip_____

*Price is per person based on double occupancy and includes GIT air fare from the West Coast (Saturday departures) based on group of 15. We help you join the group. Higher fares apply if group is not formed.

American Airlines

To The Good Life.©

"The Good Life" © 1963, Paris Music Co. Inc. Used by permission.

fact that the jet-black slab of architecture nearby (which did not appear in your photograph) goes with the Shrine. It was the intention of the designers to depict, by the contrasting black and white, one of the beliefs of the Qumran sect, from whom the scroll came, that they were the "Sons of Light" at war with the "Sons of Darkness."

Richard H. McGrath
Covington, Kentucky

Phenomena, comment and notes

Dear Sir: As a sequel to your item on the first known Manx shearwater chick to hatch on the North American continent, I would like to report that on August 17 the nest on Penikese Island was rediscovered by Professor Jean Baer of the University of Neuchâtel, Switzerland, a member of the expedition to the island commemorating the centennial of the founding of the Anderson School [famous but short-lived] there by the naturalist Louis Agassiz in 1873.

I am glad to report that the Manx shearwater chick [see below] was apparently in good shape and faring well.

Donald J. Zinn
Professor of zoology
University of Rhode Island
Kingston, Rhode Island

Dr. Jean Baer holds chick cautiously.

Taras Kiceniuk

Dear Sir: I read with interest the article by William Childress, "It's a bird? It's Taras Kiceniuk"—but I would like to call to your attention several inaccuracies.

Mr. Childress refers to "Rogallo kites,

COURVOISIER

COGNAC

IMPORTED BY W. A. TAYLOR & CO., N. Y., N. Y., 80 PROOF, SOLE DISTRIBUTORS FOR THE U.S.A.

A lasting testimony to the word "comfort".

Leather so soft it's hard to describe!

In over 20 years of selling Deer Mocs to our customers, we've yet to discover a way of putting into words the comfort and honest pleasure you'll experience while wearing them. All you feel is the velvet-like softness of the deerskin gently molding itself to the shape of your foot.

Lightweight and cushioned with foam.

Sewn between the sole and innersole is a layer of polyurethane foam that cushions each step and protects your feet from chilly floors. Deer Mocs are extremely light, (about 7 ozs. an average pair) so you feel no sensation of lifting anything but your feet. Deer Mocs . . . soft, supple, and backed with an uncompromising guarantee of satisfaction.

Men's: medium width; 6-12, 13 & 14. **Women's:** medium width; 4-11 . . . . . **$15.00** ppd.

Handcrafted from golden-tan deerskin for unbelievable comfort indoors or out. Great for travel because they can be packed in little more space than it takes for a pair of socks!

Norm Thompson Dept. S-D

1805 N.W. Thurman • Portland, Or. 97209
Telephone orders any time: (503) 221-0380

Deer Mocs	Quantity	Size
Men's		
Women's		

☐ Check enclosed. Charge to my ☐ Bank-Americard. ☐ Master Charge. (Please include all raised letters and numbers on credit card.)

Card #_____

Signature X_____

☐ **Send FREE 80 pg. color catalog** Save on exclusive fashions for men & women, fine sportswear & equipment, and articles for your home.

Name_____

Address_____

City_____

State_____ Zip_____

bamboo creations which performed erratically and which have injured people." It is true, regretfully, that injuries have occurred to Rogallo flyers, of whom there are a great many more than there are Icarus flyers; pilots of conventional aircraft sustain injuries, too. And so do many bike riders.

The article mentions Taras' having had a sustained flight of almost two-and-a-half hours. This record has long since been broken by a Rogallo.

I have long followed Taras Kiceniuk's experiments with interest and approval, but regret that the author felt it necessary to "put down" a different design of hang glider. Remember that Otto Lilienthal—no careless youngster—met his death gliding on a design that had much more in common with an Icarus than with a Rogallo glider.

Gertrude S. Rogallo
Kitty Hawk, North Carolina

In the last year, improvements over the bamboo and plastic Rogallos have been made, and most of the kites are now made of Dacron, stainless steel cable and aluminum. The caption stating that Taras soared for a hang-glider record of two-and-a-half hours should have been more specific. The time was for a duration record for any type of glider, but it now stands as a record for bi-wing, foot-launched gliders. Taras' record has been broken in the last year by Rogallo kite gliders—including a record of 8 hours, 25 minutes in Hawaii. Ed.

U.S. endangered animals

Dear Sir: I was interested in the excellent photographs of animals in peril by Nina Leen.

I would like to draw the attention of modern ecologists to one who was a champion of ecology 200 years ago, namely Robert Burns.

With his unique genius for saying much in little, he states in his exquisite poem, "To a Mouse":

I'm truly sorry Man's dominion
Has broken Nature's social union,
An' justifies th' ill opinion
Which makes thee startle
At me, thy poor, earth-born companion
An' fellow-mortal!

George W. Gourlay
Clearwater, Florida

Wrong number?

Error on your phone bill?

We'll take care of it.

If you reach a wrong number when you're dialing a toll call, let the operator know about it as soon as it happens. We'll help you get the charge removed.

If the call does turn up on your bill, or if you are charged for a call you didn't make, just call your local Bell business office.

We know mistakes can happen. A service representative will be happy to correct any that turn up on your bill.

At AT&T and your local Bell Company, we agree: you shouldn't have to pay for calls you didn't make.

We hear you.

By Joseph E. Brown
Color photographs by Jon Brenneis

A city that sits on the probability of more quakes

City Manager Joe Talbot needs accurate, short-term predictions. Hollister is in the background.

The people of Hollister, California, have come to terms with the fault that is literally tearing the community apart

The Central California community of Hollister nestles in productive farm country 80 miles southeast of San Francisco. Its 8,500 citizens live in tidy wooden and stucco homes along tree-shaded streets. They raise cattle, grow apricots, plums and wine grapes, cheer their favorites at local rodeos, and disappear en masse into the nearby Gabilan and Diablo mountains during the deer season.

Few things distinguish Hollister from hundreds of other Western communities. But there is one major difference—a difference once a secret not to be spoken of, but now becoming a tourist attraction.

Hollister has earthquakes, lots of them. More than 20,000 a year. And the city is slowly being torn in two along a fault that runs right through its middle.

Most of the 20,000 quakes, of course, can be detected only with ultrasensitive instruments. But in an era of greatly accelerated studies of seismology, particularly the experimental work aimed at *predicting* earthquakes, even the most insignificant twitch beneath Hollister's rich earth is respectfully recorded and analyzed.

Hollister is an earth scientist's dream. The area is crisscrossed with faults. It has a recorded history of quakes going back more than a century. Its topography

Sixth Street in Hollister is being pulled apart by the same forces that cause continents to drift.

ranges, within span of human eyesight, from the solid rock of mountain ranges to the alluvial deposits of the San Benito River. And since much of the countryside is only sparsely developed, delicate instruments that record second-by-second earthquake behavior are buffered against signals generated by human activity.

As a result, the earth beneath Hollister is interlaced with a Paul Bunyan spider web of seismic instruments, some of them so sensitive they can detect a cow's steps half a mile away.

"We've learned a whole new language around here," quips Joe Talbot, Hollister's city manager since 1963. "Used to be, all we had to worry about were tomatoes, spinach, irrigation and fertilizer. Now, we're bombarded with creep, strain, tilt, fluid pore pressure, brittle fracture, soil liquification and fault tectonics. Few of us really understand what it's all about, but we all agree Hollister has become a mighty busy place."

The ultimate aim of all this study is to be able to say when an earthquake will occur. Although some scientific work on prediction predated the 20th century, scientists did not have enough information to discuss the subject seriously until a decade or so ago. In the 1960s several related campaigns, primarily efforts to learn more about earthquake mechanics, began to generate the kind of statistical information that one day may make prediction a reality.

We now know that the San Andreas Fault causes most of California's earthquakes, including many of those in Hollister, and the fault in turn is a result of continental drift. First suggested in 1915, continental drift (or, more scientifically, plate tectonics) postulates

that the Earth's crust is not a single, solid layer, but a series of miles-deep plates that "float" about on a viscous mantle. The San Andreas Fault is the meeting place of two segments of these crustal rock plates, the Pacific plate on the west grinding slowly northwest in relation to the American plate on the east.

When one plate can slide smoothly by another, or under another, no earthquakes occur. But frequently the friction where two plates meet, intensified by tremendous pressures, causes the edges to "lock" together. The main bodies of the plates continue to move, causing ever increasing strain on the locked portions. Finally the rocks break and the edges of the plates snap back to their former positions relative to the rest of the plates. The vibrations set up in the earth by this snapping are what we call an earthquake.

Plate tectonics does not account for all earthquakes, but anywhere plates meet, as happens all the way around the Pacific, earthquakes are common. By now, one of the best known meeting places on Earth is the San Andreas Fault.

The San Andreas crosses San Benito County, of which Hollister is the county seat. A second major active fault zone, the Calaveras (see p. 33) runs directly through Hollister, terminating a mile or so south of the town. There is a third fault in the same area, this one dormant (though some jittery Hollister residents recall that the fault that triggered the billion-dollar San Fernando Valley earthquake of February 9, 1971, was likewise "dormant").

A drainage ditch outside the winery has become famous as graphic evidence of an active fault.

The fault line runs right through a row of barrels in the Almadén Winery.

Hollister's active faults have produced some of the best visible evidence yet of the seismic phenomenon known as "creep"; it is this activity, perhaps more than any other, on which most earth scientists base their hopes of prediction.

In 1956, operators of the Almadén Winery near Hollister wondered why, for no apparent reason, walls had cracked, and one side of a building seemed to be slowly separating from the opposite side.

Summoned to study the damage, Karl Steinbrugge, a noted expert on the effect of earthquakes on buildings, and seismologist Don Tocher, a native of Hollister and head of San Francisco's Earthquake Mechanism Laboratory, instrumented the winery to determine what was happening. Not long afterward, they established the existence of "creep"—the slow movement of one side of a fault in relation to the opposite side. Not only was creep occurring at the winery site, but all along the San Andreas and Calaveras faults. (Because of this northwest creep, one Hollister realtor jokes that he will someday be able to sell sea-view lots in a town that is presently 25 miles from the ocean. But it won't happen in his lifetime: At the current rate of less than one inch per year, the relocation won't be completed for at least another million and a half years.)

In Hollister, creep can be visibly traced block by

block and even house by house along a 20-block section of the Calaveras Fault. Not long ago the evidence was documented by Thomas H. Rogers, a geologist at the California Division of Mines and Geology; his report, *A Trip to an Active Fault in the City of Hollister,* has become the hottest item of literature offered by the San Benito County Chamber of Commerce, previously wary of even the mention of earthquakes. Now Hollister citizens note that theirs may be the only city in which busloads of tourists and students come to gawk not at statuary or museum paintings, but at cracks in sidewalks and curbs.

Curbs and sidewalks have been offset as much as 12 inches where they were built laterally across the fault trace. Houses on the fault trace, of course, are subject to the same creep pressures, yet they bear few visible signs of damage. Many believe this is true because most are older, wooden structures built near the turn of the century, and their pliable construction tends to "give" more than that of rigidly built brick or stucco buildings.

One resident, Thomas Tomicello, notes that creep damage, occurring slowly, isn't noticeable day by day. "Over a period of years," he says, "I've found less and less room on each side of my car when I park it in the garage. What's happening is that the rectangular garage is becoming a diamond."

Creep fascinates seismologists, and it explains the nature of so much of the instrumentation in San Benito County. Creepmeters are essentially simple devices: rigid metal bars or wires are attached between pairs of pillars installed at right angles across a known fault trace. When creep occurs, measurement is made of the amount of stretch between the pillars. (Rogers has developed an even simpler device: a series of nails driven in street pavement near Hollister's Dunne Park; periodically he checks to see how much creep has offset their alignment.)

Galloping creep before a quake

While measurement of creep itself intrigues seismologists, they are downright giddy over their finding that the rate of movement periodically accelerates—usually just before an earthquake. On Labor Day 1972, for instance, creepmeters installed near the San Juan Bautista Mission recorded "galloping creep" just before a moderate temblor knocked a row of bricks from the mission.

Another clue involves the measurement of tilt—the vertical displacement of the earth near faults. Tilt has been studied for years in relationship to volcanoes whose sides were known to buckle outward just before eruption. Following the lead of Japanese seismologists who have pursued tilt research with a national passion for decades, American scientists began applying the theory to earthquakes.

While creep and tilt are the major focus of prediction research, scientists are examining other variations in the earth's physical properties to determine if and how they portend earthquakes.

A Stanford geologist, Sheldon Breiner, believes there is a definite correlation between changes in the magnetic field of fault zones and the rate of creep. Since 1956 he has been observing such changes with a series of magnetometers installed near Hollister.

Soviet scientists, working in the seismically active Garm district of Tadzhikistan, have found remarkable changes in the speed of seismic waves through the crustal rocks prior to significant local earthquakes. Similar findings have been reported in the United States, notably before the 1971 earthquake that struck the San Fernando Valley.

Other work in the United States indicates that there may be a relationship between creep and changes in water pressure and level in rocks that underlie faults. Robert Kovach of Stanford University suggests that

Rancher Howard Harris enters the recording room of his elaborate private seismological laboratory.

Free-lance writer Joseph E. Brown of San Diego, formerly editor of Oceans, *is working on a book about Man's reentry into the sea.*

earthquakes are often triggered by a loss of friction in broken rocks when ground water has filled the cracks.

To test the theory, Dr. Kovach and two colleagues had a 600-foot well dug on the winery property in 1971 and installed a measurement float. For eight months they monitored the well. Their findings: a close correlation between the water level and known fault creep in the area.

Last June, at a conference of geophysicists, Dr. Kovach reviewed the results of their work and then made a startling statement.

Within the following two weeks, he said, an earthquake of 5.8 magnitude would occur in the Hollister area "if our current geophysical theory is correct." He added that the statement should not be considered as a "prediction," but merely as "an interesting test" of the theory.

Ignoring the subtlety of semantics, California newspapers headlined what had been the first specific "prediction" of an earthquake by a leading scientist.

Two weeks passed. Although a much slighter quake was recorded near Hollister, its 2.5 magnitude was hardly the kind of temblor that Kovach had suggested. On July 5—a day after the deadline—an undaunted Kovach acknowledged disappointment that "our ability to pinpoint the time is not as accurate as we would like." But he clung to his belief that the quake would yet occur.

There have been other predictions, from equally recognized experts, just as specific as to time and magnitude. Yet none has materialized. By now, Hollister's 8,500 citizens have become accustomed to this deluge of unfulfilled prophecy. Among most scientists the failure of prediction is not considered academically demeaning.

Others, however, feel that any kind of seismic prophecy, correct or not, is at least partly designed to get more money out of the taxpayers, who foot most of the research bill, and grossly unfair to those who live in earthquake country like Hollister.

For example, Garrett Hardin, a professor of human ecology at the University of California at Santa Barbara (itself subject to frequent quakes), contends that, unlike weather forecasts which can be fairly accurately made at short range, the success of earthquake prediction may depend on a long lead time, and the resulting suspense for those affected could have "catastrophic results both economic and psychological."

The most eminent critic, perhaps, of prediction efforts is Charles Richter, the man for whom the earthquake magnitude scale is named, now professor emeritus of seismology at California Institute of Technology (see SMITHSONIAN, February 1971). In a recent letter, he stated his objections this way:

"I have repeatedly pointed out that obsession with the notion of predicting earthquakes is pernicious. It diverts the attention of the public, particularly of administrators, away from the clear and obvious means by which the risk to life and property from future earthquakes can be reduced, toward the sometimes exaggerated claims of a possibility of prediction."

Even accurate forecasts would have to be short-term to be helpful, says Hollister City Manager Joe Talbot.

Liquor store manager John Horcajo indicates the retaining wires requested by his insurance company.

Former Mayor Charles Turner, 89, lived through the 1906 quake and won't run from the threat of more.

"If I'm told, for instance, that we can expect a quake of such-and-such magnitude between 6 A.M. next Thursday and noon on Friday and if, from experience, we've learned to trust such warnings we can take proper precautions: closing schools, prohibiting public gatherings, that sort of thing. But if this information is projected over a period of several weeks or months, it would be totally useless."

Obviously aware of the controversy they have precipitated, Earth scientists nonetheless are hotly pursuing the goal of prediction, with Hollister as a major staging ground. And although they debate among themselves on many facets of the fledgling science, they agree on one important assumption: A reliable, accurate forecast system probably will result not from a single methodology, but by extracting the best and most conclusive evidence from all research.

Hollister, meanwhile, seems somewhat less than agog over the flurry of activity. The city has learned to take normal precautions against damage. The county has tightened up its building code; in stores shelved with breakables, bottle-hugging wires are a standard made-in-Hollister type of insurance policy. "Funny, though," muses one liquor store clerk. "I never thought about stringing wires to protect against earthquakes. I did it after a sonic boom smashed a

Editor Herman Wrede and Publisher Millard F. Hoyle jr. check earthquake coverage in the local newspaper.

thousand bucks worth of liquor all over the floor."

But, as for past quakes and efforts to predict future ones, most Hollisterites mirror the disdain expressed by former Mayor Charles Turner, 89. "Just can't understand all the commotion," he said not long ago. "We've always had quakes here; they crack a few walls but we don't worry. I've lived here all my life; no matter what those science guys see for the future, I'm not going to budge."

If anyone in Hollister has reason to worry, it should be Charles Turner. Then a young man of 22, he was living on a ranch near Hollister when the San Francisco earthquake rumbled through in 1906. "Hollister really got knocked for a loop by *that* quake," he said, "but it sure didn't frighten any of us away."

Until quite recently, official Hollister ignored its "earthquake problem." Except for a bronze plaque erected in 1965 at the Almadén Winery by the National Park Service to designate the San Andreas Fault as a registered natural landmark, there are no place names, signs or other public references to earthquakes or faults.

But, slowly, this head-in-the-sand attitude is changing and a minus is becoming a plus.

"When I became manager of the San Benito Chamber of Commerce about ten years ago," recalls Ladd Wilson, "it seemed outrageously stupid to publicize our earthquakes. How on earth could you entice people and industry to move to an area by telling them they very likely could get hurt or killed doing so? But a lot of us have changed our minds. We've decided that, since we can't do anything about our earthquakes, why not capitalize on them?"

A visitor to Wilson's office (which, ironically, shares space with the Hollister Red Cross) still finds nothing in official chamber literature on local quakes. But if Wilson is asked, it's a different story. From under the counter, like an offering of smut, spews a torrent of seismic literature: newspaper clippings, an earthquake bibliography and, right on top, a copy of Thomas Rogers' popular walking tour of the Calaveras Fault.

Millard Hoyle, publisher of the local daily *Free Lance,* agrees that the town's attitude toward quakes is softening. "Some time ago we proposed an earthquake museum for Hollister. Many people were outraged; they thought we should hide our head in the sand and continue to ignore earthquakes. Now the idea is gaining support, although there's still a reluctance when it comes time to put up money."

Peeling back the lighter veneer of Hollister's increasing earthquake consciousness, however, there's a more serious vein. "We joke about our earthquakes," explains City Manager Talbot, "but a lot of people here are damned scared. My wife, for example—she was driving home when the 1961 quake hit just before midnight. Power lines exploded and she thought we'd been hit by the Bomb. She's still shaken."

As in the rest of California, opinions in Hollister differ widely on seismic safety. "Everybody wants earthquake-safe buildings, but nobody can agree on what an earthquake-safe building is," offers rancher Howard Harris. "Up in Hayward [north of Hollister] they now prohibit construction within a certain distance of known faults. Our engineering research shows that it isn't proximity that's important, but the kind of soil you build on. And you know all those old school buildings the state has condemned? Ridiculous! Most are wood, which is probably ten times safer than the buildings that will replace them."

Out of the growing earthquake research one day soon, perhaps, will come some definitive answers to problems like the ones Harris describes. And the day may come when Californians will be told in advance when and where an earthquake will strike next.

Unless they listen to Rosa Palma, that is. Yugoslavian by birth, a Hollisterite by choice, Mrs. Palma holds one of two licenses issued by San Benito County to practice palmistry. A mountain of a woman who predicts fortunes, upturns in business careers and solutions to tattered love affairs with a precision her clients rate as a creditable 8.5 on an Accuracy Scale of 10, she admits that earthquake prediction is beyond even the power of her clairvoyance.

"Earthquakes? No, I can't foresee those," she murmurs emphatically. "Only God can."

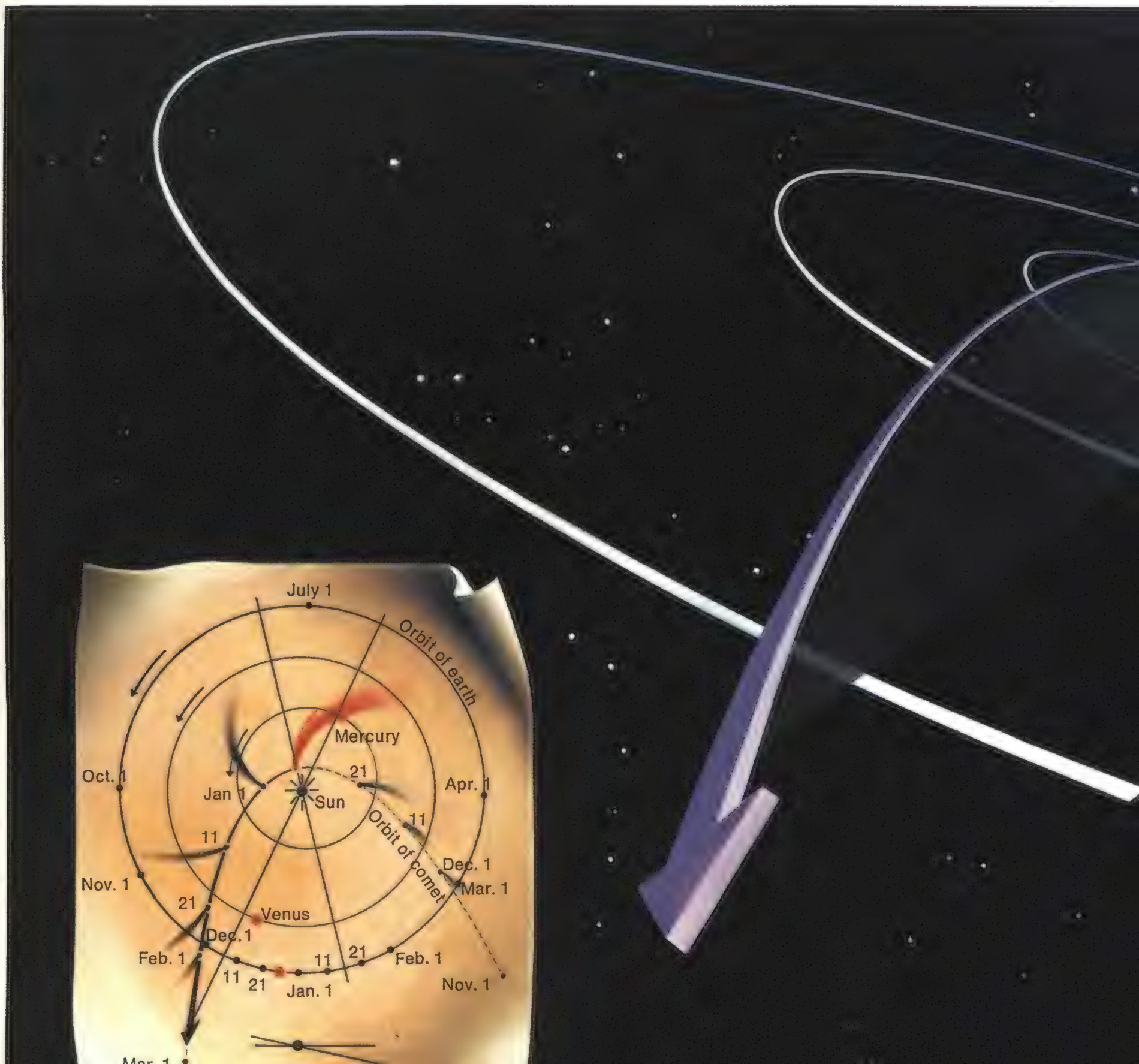
The approximate paths of faults through Hollister have been superimposed on this aerial photograph. The solid red line represents the active Calaveras; dotted lines are "dormant" faults.

Comet Kohoutek is about to shine

The morning sky this month and the evening sky in January offer a rare chance to view a real visitor from outer space

A ball of frozen gas and dust now hurtling toward the sun should provide us this month and next with one of the most spectacular celestial displays in recent years. Comet Kohoutek has come in from the cold darkness between the stars to the warmth and light of the sun. Discovered last March by a Czech astronomer, Luboš Kohoutek, in Germany, it is expected to be visible to the naked eye in the predawn sky during December, and still brighter and more spectacular in the evening sky of January.

Unlike total eclipses of the sun, which last only a few minutes, Comet Kohoutek will be in the sky for weeks. If the weather is bad one night, you can see the comet the next.



The comet had already moved in past the Earth's orbit by December 1, and is moving faster and faster toward its closest approach to the sun (a point known as perihelion) on December 28, when it will "crack the whip" around the sun at a distance of just a bit over 13 million miles.

The painting on these pages, by Helmut K. Wimmer of the American Museum-Hayden Planetarium in New York, shows what is happening in the three dimensions of space and the fourth of time. Comet Kohoutek and the Earth, Venus and Mercury are shown where they will be when the comet is closest to the sun on the morning of December 28. Behind them are the stars and the Milky Way.

The orbits of the planets are indicated by the white tracks; that of the comet by a purple track. The comet is moving in the direction of the arrow; after perihelion it will arc above the plane of the Earth's orbit on its way back out into interstellar space.

The drawing at lower left shows the position of the Earth and Comet Kohoutek for different dates. The positions they, as well as Venus and Mercury, will occupy on December 28 are marked in red.

As Comet Kohoutek approaches the sun between now and December 28, the sun's heat will vaporize some of the comet's frozen gases, and radiation pressure and solar wind will push them away from the comet's head into a long streamer, the tail. When the

comet begins to slow down as it moves away from the sun, the tail should reach its greatest length, as much as 30 million miles. This would cover about 20 degrees of the sky as we see it, or roughly a quarter of the distance from horizon to zenith.

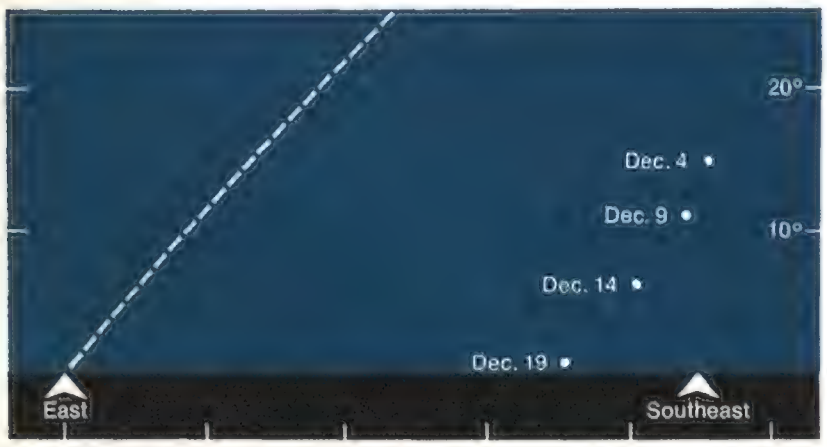
Where the comet will be at any time in the next few months is known with great accuracy; what it will look like is much more chancy. Experts caution that a 1953 comet, expected to reach great brilliancy, faded from view even before it reached perihelion.

The heavy betting, however, is that Kohoutek will be as spectacular as any of the last decade, and could even be visible in the daytime, with binoculars if not to the naked eye. When Kohoutek discovered the comet on March 7 at the Hamburg Observatory, it was still about 430 million miles from the sun, just inside Jupiter's orbit. It was just 16th magnitude (only visible in large telescopes) then, but to be seen at all at that distance, the thinking was, it must be considerably larger than the average comet. Determination of its orbit showed quickly that it would pass very close to the sun, which would make it bright and be conducive to forming a large tail.

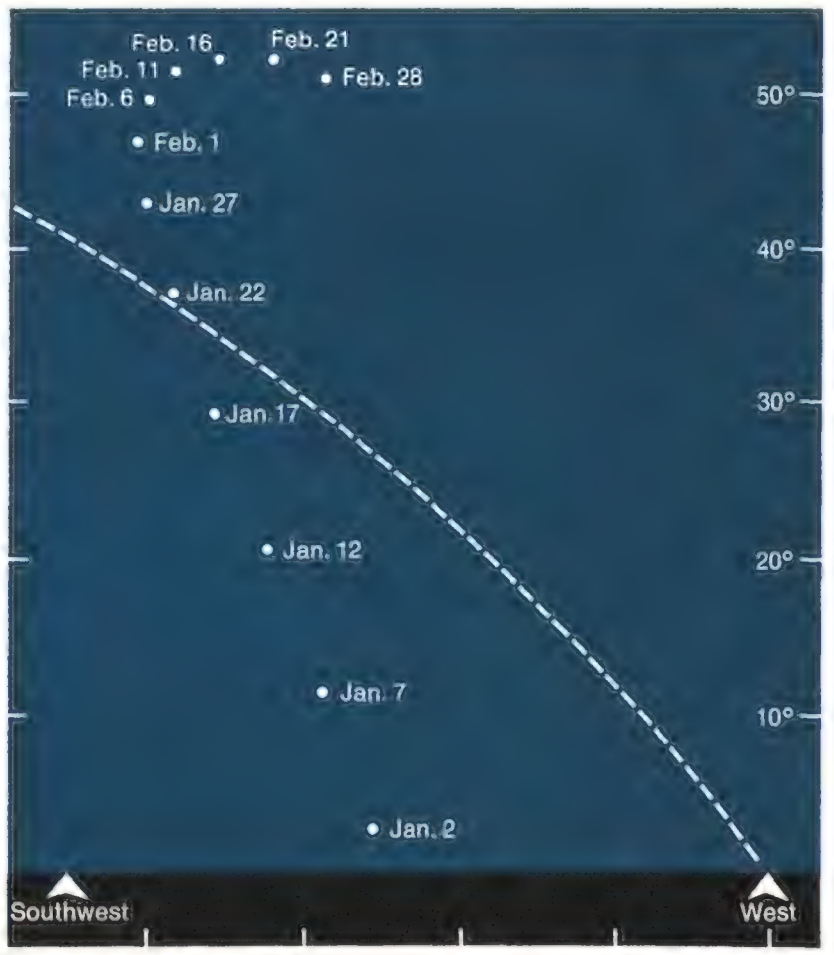
The new comet was followed intently until early May when the Earth's orbital motion placed the sun between us and the comet, and the visitor was lost in the solar glare. It was picked up again in the morning sky in late September by Tsutomu Seki, co-discoverer of the great comet of 1965, from the Kochi Observatory in Japan. By then it had brightened to magnitude 10.5, visible in small telescopes, encouraging hopes that it would subsequently become spectacular.

Much of the computation has been done by Brian G. Marsden of the Smithsonian Astrophysical Observatory, an expert on cometary orbits, who doubles as director of the Central Bureau for Astronomical Telegrams of the International Astronomical Union, an early-warning system for observatories.

In October, Marsden predicted that Kohoutek would become barely visible to the naked eye by perhaps mid- or late November and could be 1st magnitude (as bright as all but the very brightest stars) by mid-December. At perihelion on December 28 the comet could be shining at magnitude −4, as bright as



What direction and how high to look for Comet Kohoutek in the morning sky of December are indicated in this finder chart. The positions are for about an hour before sunrise for each date.



This chart shows where the comet will be in the evening sky about an hour after sunset on different dates in January and February; the dashed line in both represents the celestial equator.

Venus at its most brilliant, or even brighter. It may be bright enough to be seen in the daytime; it won't be easy, though, because the comet will be only four or five solar diameters from the sun. A day later the comet will be 12 or more diameters away, still very close, as it moves away from the sun toward the northern part of the sky.

In January the comet will come into its own for Earth-bound observers. As the comet moves farther away from the sun, it will emerge from the evening twilight and stand out like a searchlight against the black winter sky. It will not appear to be moving, but a couple of night's observations will reveal it is changing its position against the background of the stars.

By January 10 it will be about 20 degrees above the southwest horizon an hour after sunset, still brighter than most stars. The next week or ten days should be the best time to see it: This is the time the tail will be longest, and it will be climbing higher and higher into the night sky. Kohoutek comes closest to the Earth, about 75 million miles away, on the 15th of January.

By January 20 the comet will have faded to 2nd magnitude, about as bright as Polaris, the North Star. It will be farthest from the sun in the sky in mid-February (about 70 degrees) and will be at the limit of naked-eye visibility. Then it will move slowly back down the sky into twilight, rapidly fading as it moves out beyond the orbit of Mars. Its magnitude will be 8 in mid-March and 11 by mid-May.

The comet is especially interesting to scientists because they have had so much time to plan their observations; Marsden suggests they may never again have nine months to get ready. Kohoutek will be studied by optical and radio telescopes from the ground and by satellites and rockets in space. The third crew of Skylab astronauts plans intensive study from high above the atmosphere.

Comet Kohoutek may not be quite as dramatic as was Halley's Comet in 1910, but it certainly will be as spectacular as anything we're likely to see in the next few years. And it will definitely be worth a trip out into the cold.

Comet Kohoutek may look something like this in the evening sky of January 6, here shining over an imaginary western horizon. Immediately to its left is Venus; farther to the left is Jupiter.

Carritt studies a Fantin-Latour in his office with ultraviolet light, which reveals overpainting.

By Maureen Green

Meet Mr. Carritt, master sleuth of the art world

He has a habit of turning up old masters, sometimes in out-of-the-way places but often under the very eyes of their owners

With dedication even greater than that of Inspector Maigret pursuing murderers, David Carritt pursues paintings. He is the Great Detective of the art market.

The National Gallery in London is proudly displaying a recent acquisition, a rare portrait by the Flemish artist Rogier van der Weyden (p. 45), valued at £1 million, that David Carritt found in a Thames-side cottage; in another room of the Gallery there is a Tiepolo ceiling (pp. 40-41), sought by many but finally traced by Carritt to an embassy in London. Two Guardis which now sparkle on the walls of the National Gallery of Art in Washington do so only because 14 years ago David Carritt stumbled on them in a dirty Dublin shed, where they were rolled up like old linoleum. A missing panel from a great altarpiece was spotted by Carritt at a Paris sale in 1971, where it was vaguely labeled "Sienese school," and subsequently sold as a Giovanni di Paolo to California collector Norton Simon (p. 43). And Carritt's most controversial find, a long-lost Caravaggio, known in this century only by

Fitzwilliam Museum, Cambridge

Carritt's first coup was to recognize this work, attributed to one Carotto, as an authentic Albrecht Dürer, *St. Jerome*. The startled owner found its new identity too burdensome and put it out on loan.

its copies, has now been purchased by the Detroit Institute of Arts, where it is to be unveiled for scholars and public to judge.

The importance and consistency of his finds have propelled David Carritt, in the space of just a little more than 12 years, from being a brilliant outsider who seemed to know rather a lot about paintings into an authority in the international art market. Although it affects a pompous gentility, the world of art dealers conceals business methods of primitive ruthlessness and doesn't let anyone in without a struggle; but Carritt, a lone enthusiast, zestfully living by his wits, has made it on the sheer strength of his knowledge, his eye and his flair. He knows more than most art dealers.

And Carritt knows he knows. Undeterred by any trace of modesty, lively and astringent, David Carritt's personality also rattles the traditionalists. At 46 he still has the blond, blue-eyed looks and the pert manner of a clever child who used to stun the grown-ups. He hopes he has left behind the years of maximum irritation. "It's rather a relief to be middle-aged," he confesses, "and have people not be irritated when one says something. On the matters of connoisseurship any opinion from a young man is looked upon as appalling bumptiousness."

Off to an early start

David Carritt began to express his opinions, and be reproved for his bumptiousness, very young indeed. As a child his interest brought him little but scorn. "When I arrived at school as a boy," Carritt remembers bitterly, "we were each allowed to have one magazine subscription. I asked for *Country Life* because I liked to look at the articles on houses and their contents. The teachers were appalled. I should have asked for *Hotspur* or some comic, like the other little boys. My tastes were thought proper to rather privileged grown-ups." In later years, when he was at Rugby, Carritt wrote on school notepaper to the owners of important collections nearby and asked to see their works. The replies were always affable, obviously expecting one of the masters. When this schoolboy turned up, the owners were suitably shaken.

But his prodigylike start left Carritt with the foundations for his now vast knowledge of the whole of European painting. Determined to make his living through paintings, he was headed off a museum career by collecting no better than a third at Oxford. So he began to act as a dealer in old master drawings operating, as many beginners do, out of his own London flat.

Carritt's first case started out in a classically mundane fashion. There he was, flipping through picture

Maureen Green is a London-based free-lance writer.

Courtesy of Christie's

Everybody, including Britain's National Gallery, was seeking this "lost" Tiepolo ceiling, but it

references at the Witt library in London, as countless other art students, journalists and dealers do, when he came across a black-and-white photograph of a picture of a saint with a lion in one corner.

Possibly because of the lion, it was described as the work of a minor Venetian painter, Carotto. When Carritt turned the picture over, it said on the back that it belonged to Britain's premier baronet, Sir Edmund Bacon. By now keenly interested, Carritt wrote to Sir Edmund and asked if he could come by to see the Carotto. After he had seen it, he informed Sir Edmund that he was the owner of a Dürer. What made Carritt so sure? Among other details, he pointed out that "the drawing for the lion survives and is known to be a Dürer."

Courtesy of the Trustees, The National Gallery, London

was Carritt who found it in an embassy. After cleaning, the gallery bought it through Christie's.

Contrary to popular belief, owners do not always enjoy being told that one of the items in their collection is extremely valuable. The Dürer was valued at £200,000 then (1956) and is probably worth four times that now. Sir Edmund Bacon was very fond of the work and enjoyed seeing it daily, but, once faced with the problems of massive insurance and turning his Norfolk home into a fortress to guard the painting, he found that the only practical plan was to give it up.

Three years later, in 1959, Carritt was poking about in Dublin. There, in a sodden dealer's shed, he stumbled on five large, very dirty rolled-up pictures that had been removed from a house in southern Ireland. To most of us the only thing Dublin and Venice might seem to have in common is damp, but Carritt, well aware of the splendors of Irish houses in the 18th century, thought the pictures just might be by the Venetian master Francesco Guardi. He couldn't be sure until the grime had been very carefully removed, and that would cost a lot of money. He persuaded a City insurance broker, Geoffrey Merton, to back his gamble, buy them and ship them to London. After long, laborious months of cleaning, the Guardis, as they indeed proved to be, were unveiled and went on show for a while at the Royal Academy. There was some discussion about which of the Guardi brothers, Francesco or Gianantonio, had painted them; there were some bitter protests from Ireland about the export of priceless works of art. But two of the paintings were sold to the National Gallery in Washington (which attributes them to the brothers jointly), and Carritt was acknowledged in the trade to be alarmingly bright.

A valuable "irrelevance"

For a spell he became the *Evening Standard*'s art critic ("I loved the gossip," he recalls with relish), while continuing his own dealing. Then, in 1962, Christie's invited him to join their staff. Christie's was languishing at the time as "the *other* London auction rooms," totally outmaneuvered by publicity-seeking Sotheby's. Carritt joined as part of a regenerating plan, and quickly became a director. Among many feats of acquisition for Christie's, the most flamboyant was his tracking down of a "lost" ceiling by Tiepolo, *Venus and Time,* known to have belonged to the 19th-century financier Henry Bischoffsheim, but unseen since 1876. The National Gallery and many private dealers were searching for the work, but Carritt was first on the spot. He found out that what is now the Egyptian Embassy in South Audley Street had formerly belonged to the financier. "The general assumption always is that things have vanished," Carritt explains disarmingly, "but generally they are simply still there—especially if they are fixed to the ceiling!" The Egyptian Embassy, under Carritt's guidance, came to see the ceiling as "a bit of an irrelevance" and it was sold in 1969 through Christie's—knocked down to London's National Gallery for £400,000.

Perhaps Carritt's most perfect coup, however, was the *St. Ivo* by Rogier van der Weyden. It was not simply lost, it was totally unknown. There were no rival dealers to be defeated, and now that it has come to light no one disputes that it is indeed a work by the rare Flemish master.

Yet three years earlier it was hanging in a cottage at Bray-on-Thames, valued by the family that owned it, so rumor has it, mainly for its resemblance to a dear aunt. "It was a fluke," David Carritt relates with theatrical modesty. "A friend of mine, Lord Donnelly of

Christie's, took me to see Lady Baird's house in southern Ireland and I admired her pictures. She asked me to come to see her country cottage sometime. Since it was at Bray, I dropped by on my way to my own house in Berkshire." He was astonished by the panel over the mantelpiece. "Lady Baird had never *heard* of Rogier van der Weyden," says Carritt with frank amusement, "so it took a great deal of coaching on my part for her to realize what a very lucky lady she was." The Baird family had inherited the painting from Lord Newlands, in whose castle in Lanarkshire it used to hang, but how it got there is unknown.

The words "family" and "inheritance" recur in art dealers' conversations with a frequency marked only in those of geneticists and genealogists. Most European art collections, great and small, were built up in the 18th and early 19th centuries by the aristocracy, and the dealers who now preside over their dispersal still seem mesmerized by the idea of "great families." Watching to see who inherits what, how collections are split up, just reading the obituaries, is part of any dealer's life. "It's very important to see who has been gathered in," admits Carritt; "deaths are more interesting than marriages."

A family's interest in its pictures varies. Some, who are devoted to a painting, will swear Carritt to secrecy during their lifetime if he comes up with a new attribution or theory about it. Others are so impressed by the current cash value that they lose little time in deciding the pictures are too great a burden.

Even now, with prices at a peak, a family can still be amazingly incurious about a painting in its possession. In April 1971, Christie's announced that Carritt had identified yet another major work—a long-lost Caravaggio, *Martha Reproving Mary for Her Vanity*. The painting has been known since the 19th century solely through copies, one of which was in the library of Christ Church, Oxford, where Carritt saw it frequently as an undergraduate. "The reason the original remained undiscovered so long," explains Carritt, "is that it belonged to a family who, apart from this one picture, had never collected paintings. This meant that those interested in pictures would not normally visit the house. But it was always labeled a Caravaggio very clearly. If the family had wanted to know anything about it, they could have inquired. A painter friend of mine—and of the family—spotted it and thought it must be the original."

Carritt saw it and decreed that it was. Not everyone was convinced. When the painting arrived at Christie's to be viewed, one rival Bond Street dealer lost no time in dismissing it as "just another seventeenth copy."

The painting failed to reach its reserve price at Christie's sale and was bought in. Carritt, however, though forced on the defensive, was still convinced that this was the original. It was removed for cleaning and was revealed, says Carritt, "as very much more obviously the original work." Carritt felt vindicated and, its reputation cleared, the painting was then sold to the Detroit Institute of Arts this year at the "Caravaggio price" of well over a million dollars.

Part of Carritt's present research is to work systematically through the reference books of the peerage and landed gentry to track down those individuals who are the last of any collecting line. After compiling an elaborate "Who's Got What," he gets himself invited. "When I started out, I knew which families had the things, but I didn't know the families. I have very wide social connections now," he purrs. His connections also have a contemporary aspect. "The average dealer is just longing to know a duke by his Christian name," says one acid observer of the London scene, "but Carritt's world is faster, richer and more up-to-date."

International successes

In 1970 Carritt left Christie's to set up a company called Artemis to finance dealing on an international basis. His partners are the Belgian financier and collector Baron Lambert and the Liechtenstein collector Count Artur Strachwitz. Artemis has two subsidiaries, one specializing in old master works and the other dealing in the moderns.

In its short life the new company has achieved many routine and some spectacular successes on the international scene. Currently, the central drama surrounds Artemis' half-share with a German dealer in a magnificent 4th-century B.C. Greek bronze of an athlete which was dredged up by an Italian fisherman in 1964 and is now attributed by some experts to the ancient Greek sculptor Lysippus. (Italian courts finally granted an export order in 1970.) In March 1973 Carritt was

The Norton Simon Foundation, Los Angeles

This *Baptism of Christ,* although identified in an auction catalog merely as "Sienese school," was recognized by Carritt as the eighth—and missing—panel of an altarpiece by Giovanni di Paolo.

in the United States seeking a buyer—asking price $3.5 million. It is not inconceivable that the Metropolitan Museum, though perhaps momentarily inhibited from acquiring such works, may add to its collections this splendid example of Greek bronze statuary. But in this international coup, Carritt is only one of a group of experts involved.

His unique flair was seen more clearly when he was working through the catalog of a sale in Paris in 1971 and spotted a panel identified as "Sienese school" depicting the baptism of Christ. Carritt hastened to Paris, recognized the panel as part of the greatest altarpiece of the 15th-century Sienese painter Giovanni di Paolo. Six other panels, he knew, were in the Art Institute of Chicago, and a seventh was in the Robert Lehman collection, destined to go to the Metropolitan. The eighth, the baptism of Christ, had long been missing. Now here it was, and Carritt quietly bought it. Californian collector Norton Simon was delighted to pay over $1 million to acquire it for his collection in 1972.

Catalogs, the telephone and travel

Carritt's day always begins with two or three hours of intensive reading through the innumerable sale catalogs which flood through his elegant doors in Mount Street from all over the world. He would rather make a discovery in a salesroom than anywhere else, because "you are not coping with the owner direct. Then, even if you suspect that you are buying a very much better painting than it appears to be to others, you don't feel you've gypped anybody." By late morning he is off to the salesrooms. Then back to Mount Street to lunch clients or dealers in his grand yellow silk-lined dining room. There, while the soufflé is served by his butler, they can indulge in pleasant academic chat or come to brisk business decisions. The rest of Carritt's day is spent on the telephone; conversations with partners, dealers and museums all over Europe and the United States are part of the business.

So is travel. Carritt spends four months of each year on the move—to sales, to see private collections, to visit museums and churches. Much of the time he is simply looking, looking—to keep his eye nourished. Early in 1973 he traveled for seven weeks across the United States, visiting private collections and museums, "just noticing that a panel that they have in the St. Louis Art Museum is a companion to a panel in a private collection in Rutland." He is a great fan of the smaller American museums which he finds "so imaginative in their buying." This time he was particularly impressed by the Nelson Gallery-Atkins Museum in Kansas City, where "there is not one field where they have not done well with very small resources"; and a small collection, the Timken Art Gallery in San Diego,

At his country home, Carritt and his dog Tinto ride a tractor he bought instead of a painting.

"tiny but a knockout—just one masterpiece after another, and most of them bought since the war."

Though Carritt's method of seeking his discoveries cannot be totally charted—*"je ne cherche pas, je trouve,"* he says mockingly—at the back of his mind as he travels there is always a list of missing and mysterious works to be on the lookout for. He does not pursue one particular picture at a time; rather, he combs an area. "If I were in Portugal," he says, "I would visit as many monasteries and churches as possible because there are so many good things deposited there."

His reputation now brings many people to his door asking his advice about extremely variable works—they are all hoping that behind the dirty varnish Carritt will detect a Titian. "I'm constantly being rung up by people who say they have a Titian or a Velázquez. I ask them how they got it. If they say, 'Well, Father was given it in South America in payment of some gambling debt,' I don't go. I ask for a photograph. But if they say, 'We think it came into the family in the 1830s, when one of us married so-and-so,' and mention a family name that I know had an interest in painting, then I go. It might not be a Titian, but it might be an El Greco because nothing was called El Greco in 1830."

But all the knowledge, systematic research and connections aren't by themselves going to turn up even a minor master without a good eye. "Carritt does have unusual knowledge," admits one eminent academic, "but he has more than that. It is an imaginative boldness. There is an element in him that likes to live dangerously. We are all conditioned to be doubtful, but Carritt is more prepared to wonder if a work could not be by a great artist." Carritt himself points out that "knowledge doesn't necessarily mean a good eye. If you can recognize a good work by a good master, it is not so important to be able to date an indifferent work by an indifferent pupil of the same master. The important thing is not to get the two mixed up."

Surrounded by acquisitive collectors, Carritt himself does not collect. The walls of his drawing room, which match the modern dung-colored leather sofas, have few pictures. "I don't collect because I haven't the means," he says. "It isn't possible to collect out of income. Or at least it isn't possible to collect and live well. Maybe if I lived in a cold-water, third-floor walk-up I could own some things." He sniffs: "It is to that sort of collector that works of art really disappear, because they can never afford to invite anyone to go and look at their things."

Instead, when Carritt wants to buy himself a present, he buys a tractor for his country house in Berkshire. "I could have bought an old master drawing, I suppose, but I'd rather have the tractor just the same."

What satisfies Carritt most is the excitement of the chase. "It is very exciting if you can find something. The financial aspect is terribly secondary. I'm just as pleased if I find a small work in a museum traveling under another name." What irritates him most is to be assured by innocent bystanders at parties that they, too, would like art if only they, too, knew a lot about it. "It's the other way round," Carritt always says. "You would know something about it if you liked it." David Carritt likes pictures.

Courtesy of the Trustees, The National Gallery, London

St. Ivo, a rare portrait by the Flemish master Rogier van der Weyden, was spotted by Carritt in a cottage. It has been described as a painting which "once seen, hangs forever in the memory."

We get people talking.
(To 23,000,000 people we're the telephone company)

We entertain them.
(Sylvania color TV and stereo)

We brighten their lives a bit.
(Sylvania lighting for home, industry and photography)

We're GTE...
(a growing concern for your growing needs)

General Telephone & Electronics, One Stamford Forum, Stamford, Conn. 06904

Brand-new look for the States

Fed up with those familiar state shapes? Bored by the same names, the same old flag? We could try a 38-state model

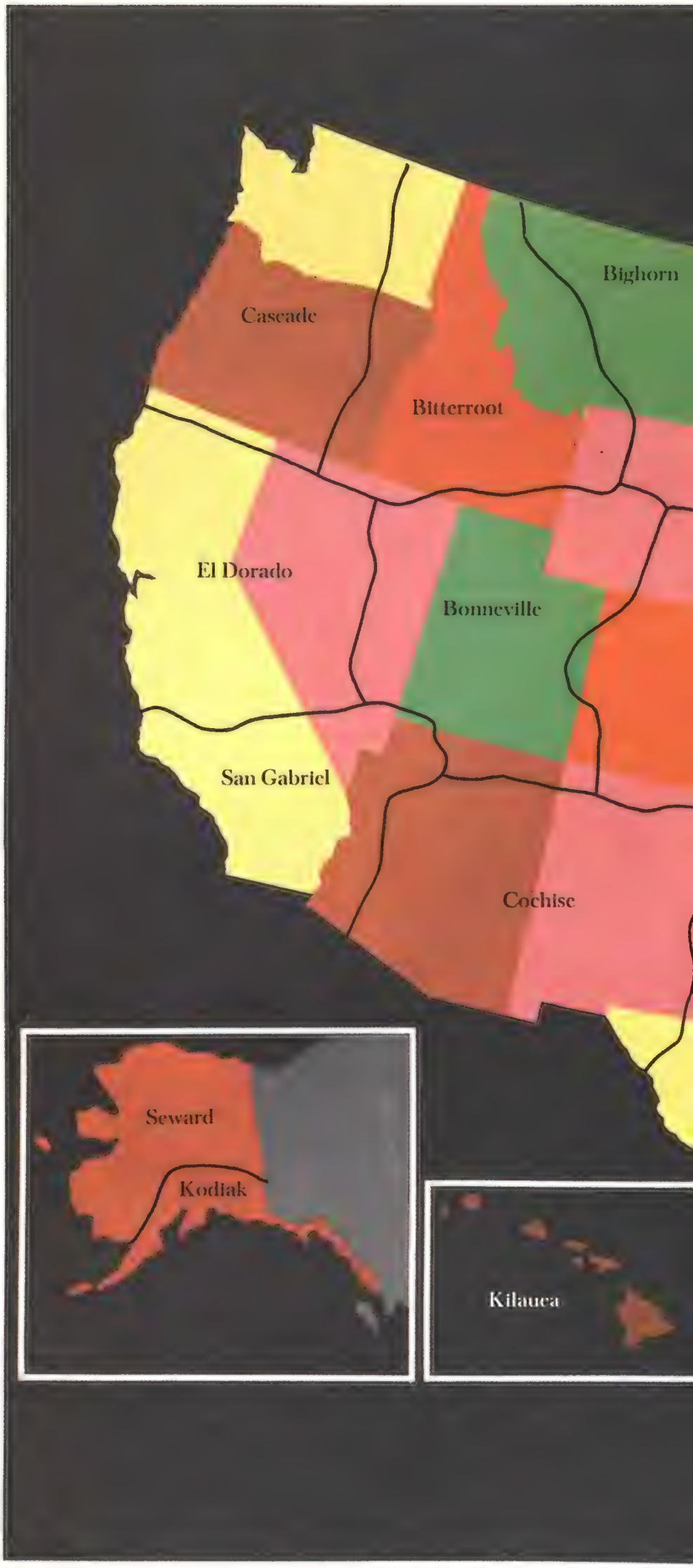
Most people may not know it, but the 104 lines that form the boundaries of what experts call the conterminous 48 states are badly drawn—that is the conclusion of G. Etzel Pearcy, a professor of geography at California State University, Los Angeles, who feels that the situation is so illogical it warrants an overhaul.

Many state borders were established along rivers which may at the time have seemed like convenient and easily recognizable boundaries. The Mississippi River, for example, borders ten states. But it is river *valleys,* not the rivers themselves, that make up proper geographical units. Many states, particularly the western ones, were established rather arbitrarily along lines of longitude and latitude—a system that offends modern geographers.

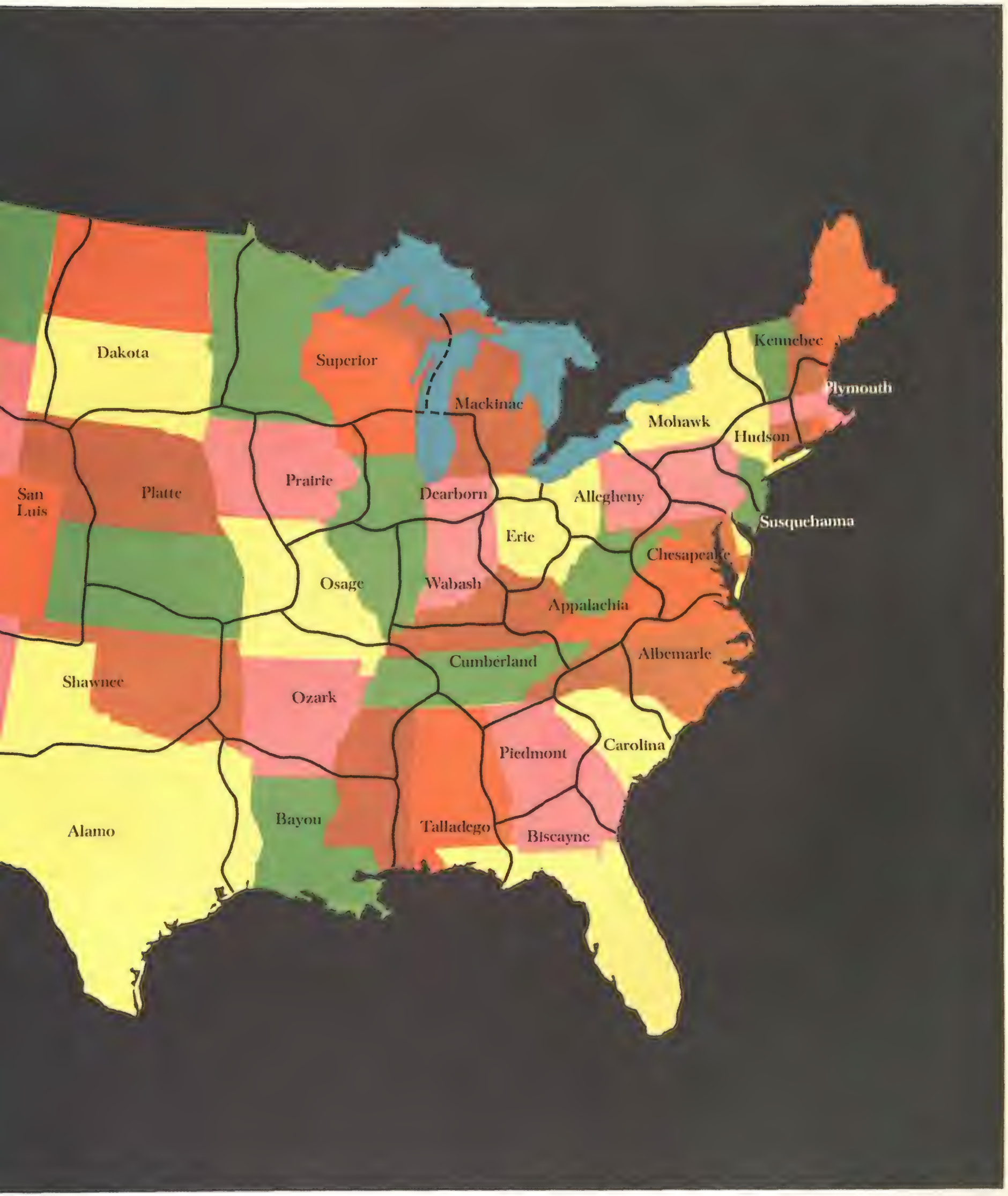
Whatever the logic of their original establishment, there has been such movement of people and growth of economic centers that the states' borders are moribund. For example, it is not only awkward, but inefficient, that a large portion of the St. Louis metropolitan area lies not in Missouri but in Illinois. New York City is worse, straddling *three* states.

Dr. Pearcy's answer to these flaws and others is what may, at first glance, look like history's greatest single effort at gerrymandering (see map, right). Yet Dr. Pearcy's motives are pure, his interests only those of geographical logic. And the result is a United States with 38 brand new states.

Before expressing outrage at finding oneself located in, say, Wabash or Plymouth or Cascade, it is a good



Superimposed over the current 50 states are 38 revised ones, drawn by a California professor to conform



to certain logical geographic principles. Even though its shape cannot be readily changed, Hawaii gets a new name. Among other things, new design achieves compactness and, the professor believes, efficiency.

idea to examine some of Dr. Pearcy's logic as it is set forth in *A Thirty-Eight State U.S.A.* (Plycon Press).

One criterion is to draw the boundaries where population is sparse, thus avoiding the division of places with high amounts of "community interest." Compromises begin immediately: There is a line that cuts just north of Trenton, New Jersey, where megalopolis is only slightly less overrun than it is to the north or south. Major metropolitan areas are embraced within one state—the new state of Hudson absorbs part of New Jersey, Connecticut, Massachusetts, Pennsylvania and southern New York, thus allowing most commuters to New York City one allegiance.

Dr. Pearcy also attempts to have major metropolitan areas in the centers of states. Thus, Chicago pulsates in the middle of the new state of Dearborn. But, of necessity, Los Angeles remains eccentrically on the coast of San Gabriel.

The scheme is egalitarian. Alaska, our largest state, is at present 483 times bigger than Rhode Island, our smallest. But with only 38 states, "their average size is increased by about a fourth." And all the states are more compact. Such features as the Oklahoma panhandle have been eliminated as "unnecessary irregularities," though "marginal protuberances" like the Florida Peninsula must remain.

Besides geographical elegance, what would be gained by such a rearrangement? About $4.6 billion a year, according to Dr. Pearcy. He estimates that some 25 percent of the cost of a state government is fixed, independent of the state's size or population. Simply cutting the number to 38 would save every citizen nearly $100 a year.

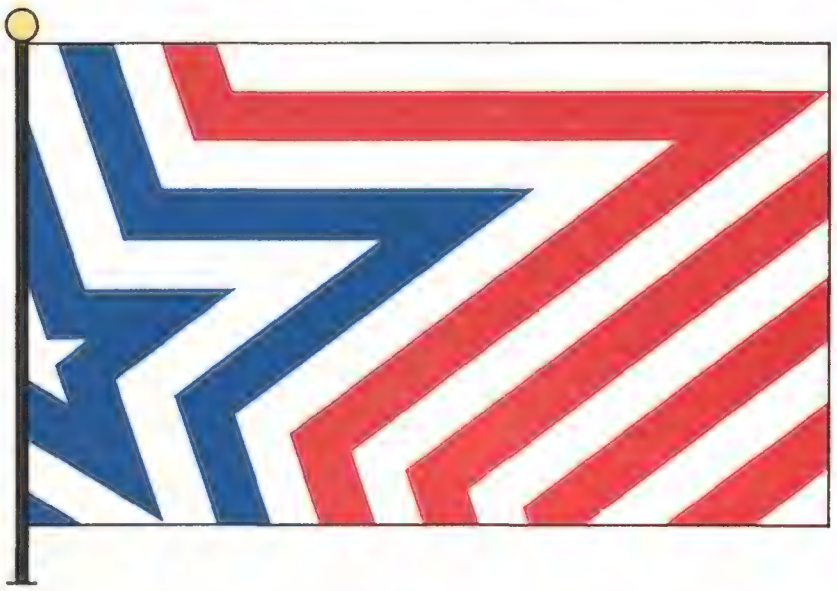
A number of other criteria were not used for Dr. Pearcy's map. He admits that "sources of water supply, location of exploitable resources, and composition of the population might well be worthwhile factors to analyze." The only thing easier to think up than other ways of going about this task is a list of reasons why it shouldn't be done at all.

To begin with, there would be so much hot air from politicians of all parties that the entire climate would be threatened. Whatever savings might eventually flow from fewer, more efficient state governments could well be eaten up in the swelling of a single bureaucracy, the United States Board on Geographic Names. (As for Dr. Pearcy's new state names, they were selected with the help of a poll of geography students and, indeed, a great many of them have a pleasingly stirring ring.)

Redrawing the states would also necessitate a new look for Old Glory. In spite of the odds against such a change taking place, SMITHSONIAN asked for a new design (below) from Whitney Smith of the Flag Research Center in Winchester, Massachusetts. Its cross section of 13 stars set one over the other, says Mr. Smith, is "easy to recognize and make, symbolic of the variety and dynamic growth of the country itself, distinctive, and unlike any other national flag."

The chief obstacle to such schemes is that people just don't like change. But just about everything *is* changing. We dial direct now instead of chatting with an operator. We will certainly go metric before too long. No doubt we will soon be precisely numbered members of a cashless society. Perhaps we should make all such changes (including the alteration of states' silhouettes) at the same time. For a brief period, everyone would be utterly confused about everything and then, one hopes, we would emerge all at once into a new era of efficiency and abiding clarity.

Redividing the states would mean redesigning the flag. In vexillologist Whitney Smith's scheme, he retains the symbolism of 13. "No attempt was made to symbolize individual units of government; rather, the flag stands for all of them collectively, in a design that stresses national unity in diversity."



L'Heure Bleue 1913

Mitsouko 1921

Shalimar 1925

Vol de Nuit 1933

Chamade 1970

Guerlain has been doing beautiful thing
to men and women for a long time

Once you come to Almadén, you've come all the way.
Almadén Champagnes. Brut, Extra Dry, Blanc de Blancs.

ALMADÉN

It seems right-handedness has evolutionary value, or is at least part of a pattern that does.

by Daniel Jack Chasan

Left and right, more than military

Baseball players are one way or the other, but so are sugar molecules, the brain's hemispheres, twining vines and amino acids

One of the hoariest situations in what used to be our national pastime has two connoisseurs watching a certain hot-shot infielder. The guy can hit, he can run, he can throw, one boasts. Yeah, the other says drily, "but can he go to his right?"

This is mildly obscure under the best of circumstances, but it does refer to a fundamental principle of baseball: Most ball players—and virtually all infielders except first basemen—are right-handed, wear their gloves on their left hands, and have more trouble fielding balls hit to their right, or ungloved, sides than those hit to their left.

This is not an isolated phenomenon. As SMITHSONIAN noted in August 1973, painters, too, have trouble going to their right. Two British professors had found that in some 60 percent of 1,474 portraits, the painter showed the subject's left cheek. One possible explanation, according to the British journal *Nature*,

which reported the study, is that most painters, too, are right-handed, so it's easier for them to draw a profile to the left of the canvas.

But right-handedness doesn't explain the behavior of mothers with young babies, most of whom go to their right very badly indeed. Pediatric psychologist Lee Salk has shown that mothers tend overwhelmingly to hold their babies on their left sides. Right-handed mothers say that of course they want to leave their right hands free. Left-handed mothers say that of course it's natural for them to use their left hands. Salk surmises that both are wrong, that in fact a baby held on the left side is closer to the mother's heartbeat and is soothed by it—and the mother may be soothed by having the heartbeat reflected back—so that holding babies on the left side may have a definite evolutionary value.

Although the left-handed five percent of our adult population will undoubtedly protest, it seems likely that right-handedness, too, has an evolutionary value, or is at least part of a physiological pattern that does. The brain is divided into two halves, the right and left cerebral hemispheres. The two halves look virtually identical, and are involved in a lot of the same work, but there is a division of labor between them; for instance, all information received from the right side of the visual field (not simply from the right eye) is processed through the left side, and vice versa. This is true in all higher animals with the exception of Siamese cats, which seem to be wired up rather eccentrically.

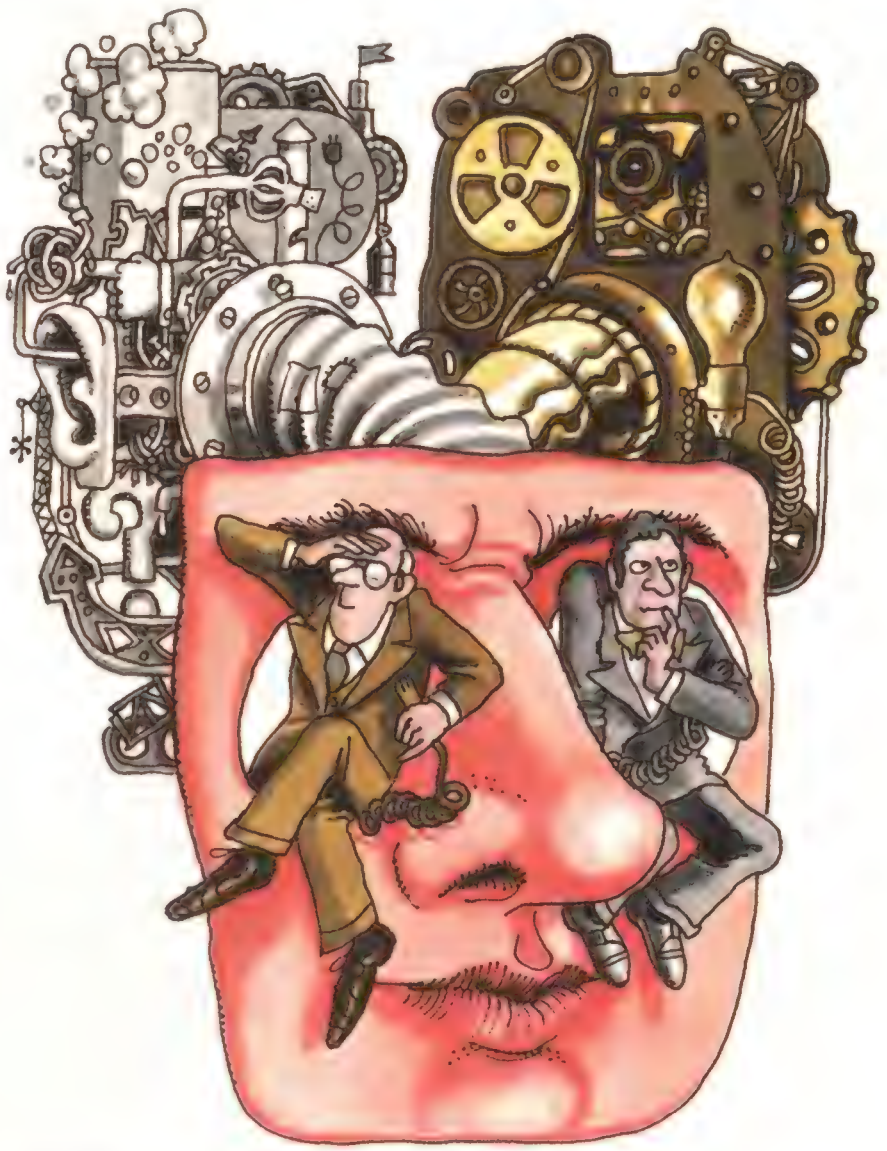
In human beings, though, and only in human beings, the division becomes outright specialization. This specialization has developed in areas where we like to consider ourselves superior to our fellow creatures: the perception of complex visual patterns, and the use of language. The perception of visual patterns, such as facial profiles and complex designs, is handled predominantly by the right side of the brain. Speech, the perception of verbal patterns and the construction of sentences is handled mostly by the left.

It has been discussed how most people become left-hemisphere, verbal types or right-hemisphere, nonverbal types early in life, a development that clearly influences the way they respond to the world. Left-hemisphere types tend to be analytical and an unusually high proportion become scientists and writers. Right-hemisphere types tend to choose such nonverbal work as dance and sculpture, and incidentally are much easier to hypnotize.

The direction in which your eyes move when you concentrate on a mental task shows which hemisphere you prefer. If you look to the right, you probably are a left-hemisphere type, and vice versa.

We may someday reserve the terms left and right, when discussing people, to describe a person's whole

Mr. Chasan, who most recently reported on personal rapid transit and the San Francisco Bay area subway for SMITHSONIAN, *is right-handed.*



Information received from the right side of the visual field is processed through the left hemisphere of the brain, and vice versa.

approach to life rather than just which hand he or she eats with.

There is some evidence that when surgeons working deep within the brain stimulate certain areas on the left side, they improve a person's short-term memory and if they stimulate certain other areas, they worsen it. When corresponding places on the right side are stimulated, however, memory is not affected at all. It seems likely that in order to refine certain kinds of mental functioning, the human brain has had to specialize, with some activities being handled by one side and some by the other. That is the context in which right-handedness is controlled by the left side of the brain. Left-handedness is not controlled by the right. In people who are left-handed, the normal control mechanism is just, shall we say, a bit confused.

The rube pitcher in Ring Lardner's *You Know Me Al* was a little blunter: "I guess all these lefthanders is alike though I thought this Allen had some sense. I thought he was different from the most and was not so rummy but they are all alike Al and they are all lucky that somebody don't hit them over the head with an ax and kill them but I guess at that you could not hurt no lefthanders by hitting them over the head."

Left-handers are certainly no more confused, though, than is the twining plant *Scyphanthus elegans,* a native of Chile. In general each plant genus that grows by twining around a support twines only in one direction, to its left or to its right. Honeysuckle, for instance, always twines clockwise, to its right, while jasmine always twines counterclockwise, to its left. No one knows exactly why certain plants twine only in certain directions, but experimental efforts to make them go the other way have always failed. However, there are a few eccentrics, including *S. elegans,* that have no fixed direction at all. *S. elegans* will start twining in one direction, make a couple of loops around its support, then go back the other way, reversing itself every couple of loops all the way up. It may be a more interesting way to climb, but it's not a very tidy system.

Bad though they may be for your teeth, sugar molecules are much tidier. It turns out that, if you pass a beam of polarized light through a sucrose solution, the light will invariably twist to the right when it emerges on the other side. The greater the concentration of sucrose, the greater the right-hand twist. The light behaves the same whether the sugar has been made from beets or from cane. Fructose, however, will invariably twist the beam of light to the left. This may all seem a mere curiosity to you, but one man's curi-

Be prepared. Put a Pocket in your pocket.

The little Kodak pocket Instamatic 40 camera is great to have along for those unexpected pictures.

An electronic shutter and CdS electric eye give you automatic exposure control. The fast shutter speed can take action-stopping pictures in bright sunlight. There's a sharp 3-element lens that focuses down to 3 feet for close-ups. Best of all, our Pocket 40 gives you big beautiful pictures or brilliant color slides.

Pocket a Pocket 40 for less than $68. Other Pockets start at less than $23.

Prices subject to change without notice.

Kodak pocket Instamatic® cameras.

Kodak

In people who are left-handed, the normal control mechanism of the brain is just a bit confused.

Most twining plants twist in only one direction, but a few eccentrics can't make up their minds.

osity is another man's analytical tool, and if you were a sugar industry chemist, you'd put it to good use.

As it is, whoever you are, you exhibit a similar trait in your amino acids, the complex substances that make up all proteins. All amino acids occur in two forms, mirror images of each other, called stereoisomers. The two classes, denoted by the prefixes L and D, are both found in meteorites and in laboratory simulations of conditions on Earth before life appeared. There is no discernible reason why both kinds could not exist in the protein of living things. But both kinds don't. All protein contains amino acids of only the L configuration; D-amino acids have not been found in protein.

From the bending of light by amino acids to various activities of the brain, there is absolutely no doubt that any number of things take place in certain prescribed directions. But physicists, who are among the very few human beings who spend much time worrying about such matters, have been known to ask whether or not they have to. Is there any reason why a process that takes place from right to left, or clockwise or in a northerly direction, couldn't plausibly be reversed to run southerly, or counterclockwise or left to right? In the early days of work on quantum mechanics, the great Hungarian-born physicist Eugene Wigner, who pioneered in the design of a breeder reactor, decided that there was not. Wigner's theory, known as the law of conservation of parity, says essentially that any object or process and its mirror image are, at least theoretically, equally able to exist. For two decades, conservation of parity was accepted as a basic principle of physics. Then, in 1956, the American theoretical physicists Chen Ning Yang and Tsung-Dao Lee suggested that the law of conservation of parity might not hold true for the slow decay of certain elementary particles. Their hypothesis was confirmed experimentally by Chien-Shiung Wu, and they received a Nobel Prize for it in 1957. It turns out that during beta decay, a process in which radioactive materials emit electrons or positrons, they also send out other particles called neutrinos, which spin in the direction of a left-hand screw. This spin is an irreversible part of the neutrinos' nature. There can be no mirror image, because the neutrinos cannot be made to spin the other way.

In other words, the crucial question posed by Yang and Lee was, essentially, "can it go to its right?" and the answer, as they had hypothesized, was an unequivocal "no." Not even—as those grandstand connoisseurs in the story might have observed—if the bum was on roller skates.

In the military tradition of marching, the first step always is taken by the left foot and the emphasis in marking time is placed on that foot.

SMIRNOFF SILVER® VODKA. 90.4 PROOF. DIST. FROM GRAIN. STE. PIERRE SMIRNOFF FLS. (DIV. OF HEUBLEIN.) ©1973, HEUBLEIN, INC., HARTFORD, CONN.

The Silver Martini.
For people who want a silver lining without the cloud.

Smirnoff Silver. Ninety point four proof. Smirnoff leaves you breathless®

Instant joy.

*Comparison based on suggested list T88/T108.
**About $11 less without Focused Flash.

From under $25.

In just 60 seconds, a Polaroid Land camera captures the spirit of Christmas. And lets you hold it in your hand.

It's the kind of magic that lasts all year long. And here are seven great ways you can give it.

Square Shooter 2. Under $25.

Our least expensive all-purpose camera. It's strictly color and you can save up to 25%* with our square film. There's an electric eye and electronic shutter for automatic exposures (even for flash). A sharp 3-element lens. An ingenious viewfinder and built-in flash.

Minute Maker Kit. Under $36.

This handy little kit contains everything you need to take instant pictures. There's the

Square Shooter 2, our most popular camera. 2 Sylvania Blue Dot flashcubes (4 shots each). A pack of square color film (for 8 beautiful moments). And a coupon good for 3 free copies of a favorite instant picture. A handsome carrying case wraps it all up.

The Colorpack Camera. Under $40.

The surprise here is that it doesn't cost more. This camera takes both color and black-and-white shots. (Big rectangular pictures. 3¼" x 4¼".) And a built-in development timer tells you when they're ready. It has a 3-element lens. And our unique face-in-the-square viewfinder. And it takes standard or Hi-Power cubes (for great flash pictures up to 12 ft.).

Models 420, 430, 440, 450.
From under $71
with Focused Flash.**

Our 400s are well worth looking into. They all use Focused Flash which, as you focus, automatically keeps the picture from being too light or too dark.

The 420 is the most economical. It gives big color pictures in a minute or black-and-white in seconds. Our 430 has a built-in mechanical timer that buzzes when the picture is ready. Our 440 can take automatic time exposures up to 5 seconds. It also has a built-in timer. Our 450 is the top of this line. (Under $176 with Focused Flash.**) An electronic development timer beeps when the picture is ready. And it has a deluxe Zeiss Ikon single-window rangefinder-viewfinder.

Colorpack Film.

One pack of film gives 8 beautiful Christmas presents on the spot. Type 88 for the Square Shooter 2. Type 108 for our other pack cameras.

Polaroid Land Cameras

Polaroid®

By Claire Sterling

A modern city in Diocletian's Palace after 17 centuries

The Yugoslavs are restoring the emperor's pleasure dome to keep it a living part of the town that grew up inside its walls

During that long slow moment in history when Imperial Rome declined and fell, one of its most remarkable rulers—Caius Aurelius Valerius Diocletianus (portrayed on coin above)—built what has come to be one of its most remarkable monuments. Other emperors may have outdone him in the splendor of their marbled dwellings. But his is still a home, and always has been. Three thousand people live in Diocletian's Palace today, as 80-odd generations have done before them: an unbroken tenancy going back almost 1,700 years to May 1, A.D. 305, when he moved in himself.

Life in the Palace isn't all romance; the walls are damp and the plumbing is terrible. Yet even this, or perhaps especially this, is part of its fascination. Restoration has been under way for 16 years now, the last six with the help of an American-Yugoslav archaeological team supported by the Smithsonian Institution. Restoring this singular monument, though, is not supposed to mean sorting out its purely classical stones and throwing away the rest—embalming it, in other words. The idea is to keep the Palace going as the living core of a growing city.

Split is the modern name for the Yugoslav town of 130,000 that has grown up inside and around the Palace over these 17 centuries. In Diocletian's day it was a little fishing village called Aspalathos, in ancient Rome's Dalmatian province, where tradition says he was born. Sheltered in the gently curving arm of a golden bay, the site is glorious: humps of bright green islands mirrored in the clear Adriatic Sea to the south, bold purple mountains to the north, homely vineyards on the hillside between.

In its way—a matter of taste—the Palace must have been glorious too. Made of the lustrous pale limestone quarried on the nearby island of Brač, it was a superb example of late Roman court architecture, forming a walled rectangle of nine and a half acres flanked by 16 jutting towers, crisscrossed by broad white avenues and graced by a stupendous covered gallery with 40 arches along the southern seafront facade, which is nearly 600 feet long. Helen, mother of Constantine the Great who succeeded (and loathed) Diocletian, is said to have called the place an eyesore. Writing six centuries later, the Byzantine Emperor Constantine Porphyrogenitus thought no mere plan or description could possibly convey its grandeur. Which of them was right we can't tell.

What with normal wear and tear and alterations to suit the needs and caprices of so many different occupants, the Palace has lost much of its ceremonial dignity and nearly all its overpowering symmetry. Boys play soccer under the lofty open dome of the Vestibule, where adoring visitors used to approach on hands and knees and fall prostrate before the sacred person of a monarch who represented the earthly embodiment of Jupiter. Baby carriages and television aerials festoon the dark, narrow streets superimposed on Diocletian's handsome wide ones. Clothing stores, delicatessens, ladies' hairdressers and snack bars clutter his two main thoroughfares running from east to west and north to south, the Decumanus and the Cardo

The unroofed Peristyle is now the setting for an outdoor café. The arch leads to the Vestibule (p. 70), once the entrance to Diocletian's apartments.

Photographs by Yoichi Okamoto

Maximus. Sidewalk cafés, tacky souvenir shops and soft drink stands line the southern facade facing the sea; above them, ramshackle medieval tenements are clumped like unlovely warts on the remnants of the tall slender arches which had once framed an enchanting view for the Emperor-god on his evening strolls.

Strolling about the Palace nowadays, you might come across samples of a dozen architectural eras in as many minutes: a handsome patrician doorway here and a lopsided plebeian window there, a 13th-century church belfry tacked on to a fourth-century pagan mausoleum, a hodgepodge of good and bad taste in every style from Roman to Mae West modern. The effect ought by rights to be pretty hard on the eye, and is in fact wonderfully pleasing.

Some prefer a skyscraper

Not that everybody actually living in the Palace takes much notice of that. One of my most interesting encounters there was with a young wife and mother, whose gym-teacher husband fixed up their three-room apartment in his spare time for about $500. The apartment is neat as a pin and clinically modern, as remote from the history-saturated walls showing through her spotless white nylon curtains as her own conversation is. Living where she does is quite convenient, she told me, but the air is better higher up in the newer section of Split, where her in-laws moved as soon as a skyscraper apartment was free, leaving this one to the newlyweds. When she and her husband could afford a car, which they were saving up for, they would move to something like that, too. No, she wouldn't miss the Palace—why should she? It might be picturesque for tourists, but not for somebody who'd been looking at it all her life.

Scholars, esthetes, academics and town-planners, of course, would not be inclined to share that view. Yet there must be times when some of them long to bulldoze all this enthralling historical masonry to get at the millenial accretions of mortar, stone and petrified garbage below. Somewhere down there are the answers to any number of tantalizing questions. What did a palace probably as sumptuous as any in antiquity really look like? How did the Emperor spend his days there? How did his palace turn into a town, and its population change from Roman to Slavic? What might be learned, from the matchless store of human memories here, about the habits, tastes, means and living-styles of succeeding generations?

Questions like these have intrigued historians and artists for a very long while. Andrea Palladio, master architect of the Italian Cinquecento, crossed the Adriatic to study and sketch the Palace. The great Scottish classical architect Robert Adam published the first serious monograph on it in 1764. Many distinguished visitors have contributed learned comments since. Nearly all turn out to have guessed wrong on something or other, however.

From the little that scholars knew, they might reasonably assume that Diocletian's Palace probably wouldn't have looked quite like any other of his time because, in his heroic efforts to save his tottering realm, he broke so many conventions of his time. Son of a Dalmatian freedman, he rose to command "by brilliant talents and flexible scruples," as Will Durant puts it; he revolutionized his empire in 20 years (A.D. 284 to 305), then abdicated of his own free will—the first monarch who ever did—and retired to the home he had built in Aspalathos with that in mind.

He was the first to do a good many other things, too. He extinguished the last flicker of Roman republicanism and installed an openly absolute monarchy; dreamed up the world's first system of wage and price controls; introduced unheard-of ceremonial magnifi-

Claire Sterling, who lives in Rome, writes for Atlantic Monthly *and other magazines and serves as a special correspondent for the* Washington Post.

Postcard shows the original Palace as reconstructed by the French architect E. Hébrard around 1912.

A view that spans 1,700 years, from the Palace facade (behind palms) across the old town to the high-rises on the hill. The bell tower, begun in the 13th century, was wholly rebuilt in the 19th.

A drawing of the Palace's southern facade as it originally must have looked has been superimposed on a photograph of the city to show how Split will look someday if present plans are carried out.

Dr. Sheila McNally, the Minnesota archaeologist who joined the Yugoslav team, studies finds.

cence ("He flattered himself, that an ostentation of splendour would subdue the imagination of the multitude," says Gibbon coldly); and proclaimed his own divinity. Most important, he invented the Tetrarchy, dividing royal power between co-emperors ruling over the eastern and western regions, each with a Caesar to assist and succeed him, an innovation that was to Byzantinize the Empire and forever separate Europe from Asia Minor.

How did he spend his days in Aspalathos, after such a busy reign? He grew cabbages there, very happily, or so he said. But what else he may have done there in the nine years until he died has never been recorded. Nor is much known of comings and goings at the Palace after his death in A.D. 313, until the Avars and Slavs overran that part of Dalmatia 300 years later.

It was then that the Palace ceased to be an imperial dwelling and started to be a town. Romans fleeing the barbarian invaders took refuge in this walled sanctuary, which certainly had plenty of room, after which it has never had a dull moment.

That, and the unusually well-preserved state of the Palace, was pretty much all there was to go on when excavations got started in the mid-1950s. Getting them started was no routine matter. The world, even the Dalmatian Coast alone, is full of noble ruins that might be explored with a lot less trouble. Reluctance to disturb people living just above the ancient vaults of the Palace, abrupt halts to excavations beneath an inhabited apartment upon suddenly finding that it has been resting largely on air, the risk of being pelted while digging with chicken bones, tin cans and dead cats as residents dump their refuse according to timeless custom, appalling invasions of sewage often surrounding diggers knee-deep, tons of debris yielding scarcely a recognizable coin because of the ceaseless, corroding flow of human body waste over the ages—all this might have deterred almost anybody except those who have gone ahead anyway.

The going ahead has had to do mostly with the Marasović brothers, Jerko and Tomislav, who started to excavate in 1957. Their valued ally has been Dr. Sheila McNally of the University of Minnesota, who came over to join them as co-director (with Jerko) of the Smithsonian team in 1968.

The Marasović family has lived in Split for 300 years, and Jerko and Tomislav—Tomo to his friends—grew up knowing the Palace like the backs of their hands. Now 50 and 44 respectively, they do not so much resemble as complement each other. Jerko is a large, craggy man, rather withdrawn, as passionately attached to the sea as to the stones of antiquity, and to the 30-foot boat he has spent ten years building. Tomo is slighter, lighter, gayer, more articulate and at ease with outsiders. Neither is a trained archaeologist. Jerko, head of the Town Planning Institute of Dalmatia, is an architect, Tomo an art historian. Both have the inquisitive imagination, pig-headed purpose and inhuman energy of the born explorer.

Dr. McNally's contribution has not been simply to

Jerko (left) and Tomislav Marasović in a conference room they arranged in one of the Palace towers.

help turn up several important and some sensational finds, although her team has done that, but to add an astringently critical note. If every archaeologist questions some things, Sheila McNally questions everything, with a steely professional mind you would hardly expect of this small-boned, friendly woman with her delicate hands and deceptive mildness of manner.

Apart from money, of which naturally there could never be enough, the sympathy and enthusiasm of town authorities and Palace residents were indispensable if any worthwhile digging was going to be done, she says, and both have been forthcoming. "We have excavated in a garden, in a hotel basement, under the floors of shops. The Housing Enterprise has concentrated its urban renewal efforts in the quarter where we wanted to work. The Water Board has rerouted water and sewage lines around our trenches. A cobbler vacated his shop for a month last summer, leaving shoes hanging on the walls while we dug beneath his floor to trace a mosaic. And so on."

In the sense that an undertaking like this could never be altogether finished, theirs isn't. Nevertheless, they have reached the stage of solid achievement at which they can stand back and try to see where they have been.

"This is how things were before we started," Tomo Marasović says. "The visible remains of the original Palace were its perimetric walls and three of its 40 southern arches, the square towers at its corners, and the four gates. Then there were the main buildings. Dominating the center—although we had only a pale idea of how it really was, then—was the big, roofless pillared hall we call the Peristyle. The octagonal mausoleum designed for Diocletian's tomb stood to one side and the Temple of Jupiter to the other, both in beautiful condition because the first Archbishop of Split no sooner got here in the seventh century than he threw out Diocletian's pagan bones and turned the one into a cathedral and the other into a baptistery. To the Peristyle's fore was the Vestibule giving access to the Emperor's quarters. That was about it."

The difference now is striking. Virtually the whole ground floor of the Palace has been cleared, revealing one of the great finds in the architecture of antiquity —an enormous network of some 40 vaulted rooms of every shape and size, built mostly on bedrock to

Shoppers and tourists stroll through one of the narrow streets that have grown up inside the Palace.

support the massive weight of the Palace and faithfully reflecting the disposition of now-vanished apartments overhead. Part of the arrangements on the floor above have been discovered as well, including—among other remains—two luxurious baths with basins for hot bathing; a four-leaf-clover-shaped room with three auxiliary chambers thought to have been the Triclinium or imperial dining room (though Dr. McNally predictably raises an eyebrow here); and parts of two circular temples nobody had believed in since a forgotten town clerk mentioned them 400 years ago. Such was the precision of the builders' planning that once the first of these temples was found, turning up the other was a matter of minutes. "We simply drew a chalk circle and told our diggers to look *there,* and there it was," Tomo says.

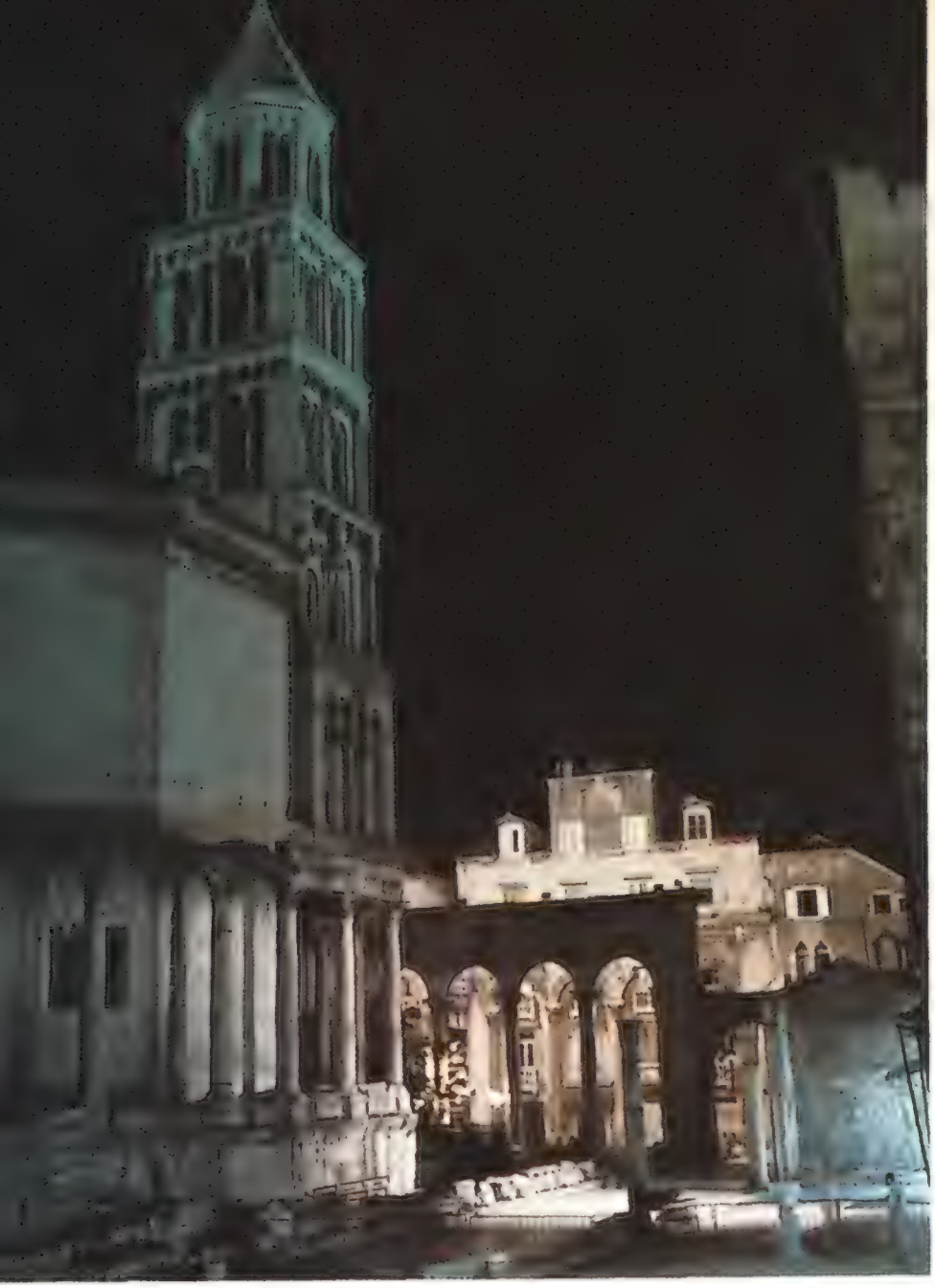
How precise these expert builders were can be gathered from the *decussis* found a meter below the Diocletianic level: a huge cross serving as a bench mark for laying out the whole Palace in all its complexity. Nearby, in what is now a smartly done-up stone and plate-glass café overlooking the Peristyle, is a drain of Diocletian's sewer system (see p. 68), another spectacular find. Almost completely traced except for the point at which it empties out to sea, the system is all but intact, and so superior to the one laid by Austro-Hungarian administrators 1,500 years later that it is going to be reactivated in the master plan to revitalize the inner Palace-town.

What all this adds up to is still partly guesswork, but much better informed guesswork now. The evidence suggests that Diocletian's Palace was indeed not quite like any other. Arrangements and decorations both were so full of innovation that, as Sheila McNally observes, "one learns to expect the unexpected." He was a retired emperor, after all, and therefore a unique one with no need for impregnable military defenses or a huge administrative staff. Relatively little space appears to have been reserved for soldiers' barracks or for apartments for the retinue of clerks and secretaries attached to any working emperor. Clearly, Diocletian's house was built for play, and for the last stretch of his stately journey toward immortality.

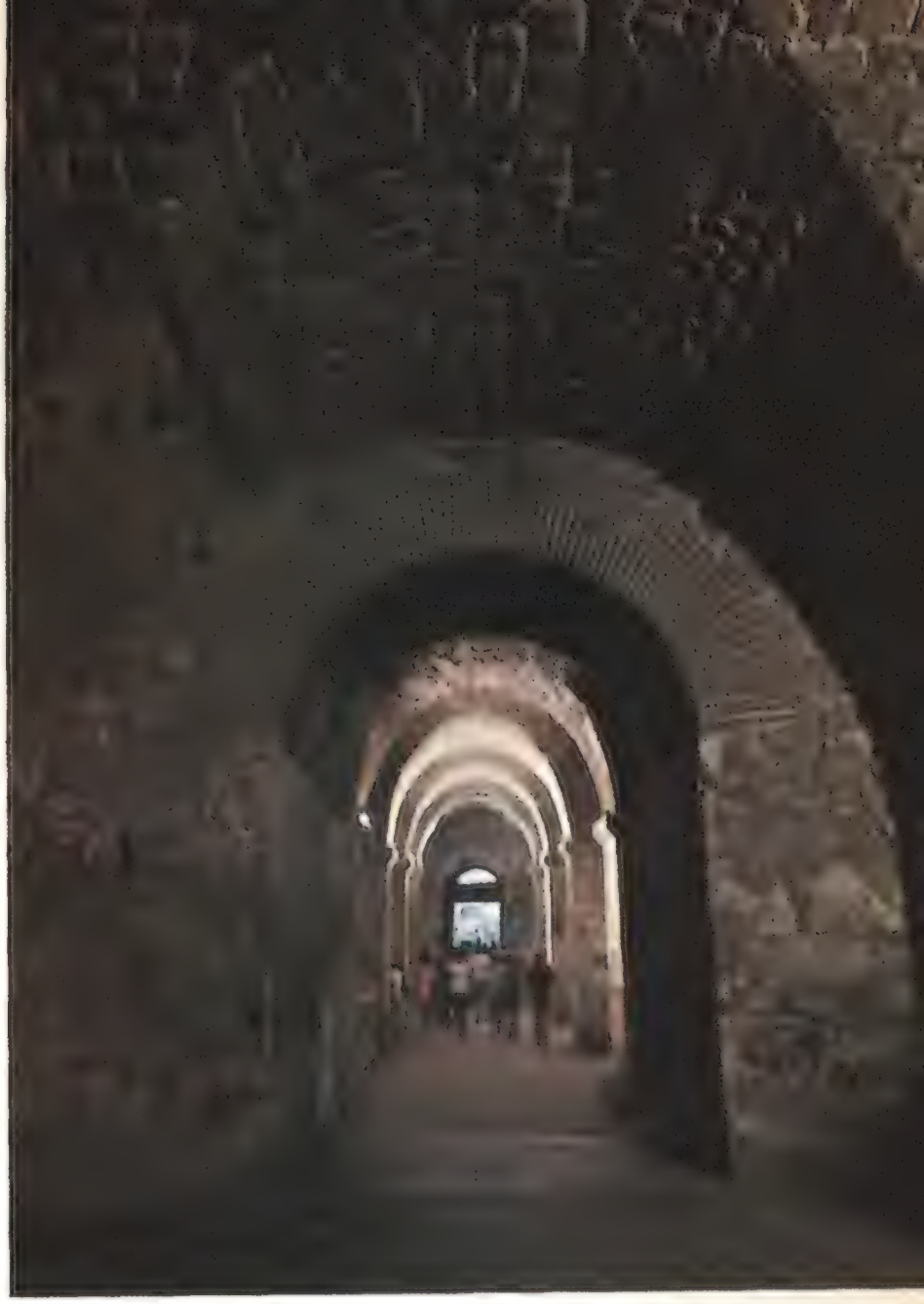
When and if he ever did strip down to his shirtsleeves, he might have used the whole Palace as his playground. Dr. McNally thinks he probably did, drifting from south to east or west and back again for light, sun, shade, shelter from the wind, sea and mountain views, a glimpse of spring flowers. In any event, his apartments in the southern wing were surely as extravagantly luxurious as any on Earth while he lived.

"Now the palace is monochrome," she says, "but once it was full of shimmering color. Fine marble and porphyry from all around the Mediterranean decorated walls and floors, while mosaics of glass and stone and gold leaf covered floors and vaulted ceilings."

Magnificent though it was, it was never finished. After ten years of extraordinarily fast building, everything stopped, with empty niches waiting for sculptures and many other decorations uncompleted. Per-



Lights from the Peristyle shine on the octagonal cathedral (left), once Diocletian's mausoleum.



Vaults under the Palace duplicate the original layout above, but were intended mainly for support.

haps Diocletian was sick and couldn't bear the noise. Or it may have been because he died, and his successor Constantine—who promptly put his wife and daughter to death—wouldn't have dreamed of perfecting such a monument.

The changes after that were swift and drastic. Historical sources suggest that royalty continued to come, at least for visits. There is also a written reference to a cloth factory for the Roman army which was in operation around the beginning of the fifth century.

Soon after, judging from the mountains of earth sifted by the Smithsonian team and the 4,500 potsherds it collected, debris began to accumulate here and there in the Palace grounds, suggesting that a scanty population was huddling together in a small area. From the 7th to the 11th centuries, inhabitants seem to have lived in squalor, mostly crowded in the cellars. What building went on above was of very poor quality, able at best to support one or two rooms on a single floor or a lean-to of wattle and daub.

Then the long dark years of poverty and isolation came to an end, with a revival of solid stone and mortar building techniques. By the 12th century, Roman baths were being ripped out and Diocletian's broad avenues were being filled up with well-built two-story houses. Later in the Middle Ages or the early Renaissance, around the 14th and 15th centuries, a time of rebuilding and town planning began which, Dr. McNally thinks, dwarfed any renovation before or after (until the current project got under way).

Little by little, the Palace-town became safe and prosperous enough for people to live there extremely well. There are Renaissance palaces built within this ancient Roman palace—the Papalić mansion, now a museum, is one—which would do honor to any city in Italy. They were beautifully maintained, by people who plainly could afford it, until the growing population of Split spilled over the Palace walls, about a century ago, and started to build outside them. Gradually, the houses within fell into disrepair, squatters moved in from the mountains and Diocletian's Palace became the world's most elegant slum.

How far it had sunk into squalor may be gathered from a survey made by Jerko Marasović's Town Planning Institute in 1957. At that time 3,056 people forming 859 families lived in 475 apartments within the

walls, a density of more than six to an apartment, in itself proof of poor living conditions. Not one apartment was classified as being in "good" condition, and only three were listed as no worse than "partially dilapidated." Very few had running water, almost none had toilets (a corner of a room was usually set aside for this purpose) and four out of five were found to be "damp and humid."

Statistics like these can't altogether convey some of the mildewed and blistered walls, peeling plaster and rotting rafters, sour smells and cobwebbed gloom I ran into myself. Nor can they account for the marvelous variety and perversity of the human spirit.

Some of the residents I met were dying to get out, and with reason. Having lived for 29 years on the ground floor of a rickety two-story dwelling now serving as the Smithsonian team's "workhouse," an 82-year-old woman and a daughter looking nearly as old had no hesitation in showing me the creeping green slime and gaping holes in their walls, nor did they mind being photographed doing so. "Why not? I'm here today, I may be gone tomorrow," the woman said.

While these two can't wait to get into one of the new low-cost high-rise suburban flats promised by the housing authorities, others already offered such flats have refused so mulishly to budge that they have had to be forcibly evacuated. One such family, whose occupancy of a Palace apartment—long since condemned —went back to the 18th century, flatly declined to part with its cherished wine cellar. Aging couples, their children married and gone, prefer to end their days where they started; Jerko's mother- and father-in-law, whose forebears have lived within the Palace walls for 500 years—and whose top-floor apartment, suitably renovated, would rent for a fortune in Rome or Paris—are among these. ("The stairs are getting to be too much for us," says the mother-in-law, "but moving is for the young.") And a number of young people disenchanted with the doubtful charms of impersonal new flats wouldn't at all mind going back if the place could be made habitable.

Is it possible to do that and at the same time save what should be saved of art and history? For the Marasović brothers, this is the heart of the matter. Jerko cannot imagine excavating and restoring a monument of lifeless distinction. "Without people the Palace would be horrible, unthinkable," he says.

For going on 20 years, his Town Planning Institute has worked closely with city authorities to study ways of revitalizing the Palace in both the archaeological and the human sense. The master plan will not be perfected until next year, but a good deal has been done already. Diocletian's southeast tower, excavated and restored from the ground up with exceptionally artful use of plate glass and fine-grained wood, now houses a stunning set of offices and conference rooms, with an attractive open-air restaurant above. Over on the northern side, a lovely Gothic building has been turned into a Workers' University, substitute pieces for its missing arches and pillars brilliantly contrived. "In archaeology such reconstruction is not permissible; in a living city it is indispensable," Tomo ob-

The drain in the foreground, now in a café, was part of Diocletian's excellent sewer system.

serves. Both the Peristyle and the great vaulted underground halls are now used for ballet, theater and concert performances during summer festivals.

About 150 dangerously unsafe apartments have been torn down, and three times as many more will have to go. Others will be shored up, cleaned up, plugged and plumbed, either for individual or for public use, depending on how grand they are. "There's no question but that any Gothic or Romanesque house still standing would be too good to waste on private habitation," Jerko explains. "We would have to find the right social use for them: meeting halls, institutes, offices, theaters, hotels, restaurants."

Altogether, he thinks, just under half the present population should be moved out eventually, the rest living mostly in the upper floors of remaining dwellings. Ground floors should be given over to shops and offices, as often as possible using large areas of plate glass to let the handsome texture of old stones show through. The more dramatic archaeological finds should be used to spectacular functional advantage: Diocletian's western baths might become the glass-bottomed dance-floor of a discotheque, and the Triclinium, or imperial dining room, could become a smashing clover-shaped restaurant. Above all, the Emperor's stupendous walking-gallery with its colonnade of 40 arches overlooking the sea must be brought to human view again. For Jerko and Tomo both, nothing could so revive the living splendor of Diocletian's Palace as the full restoration of this southern facade.

About 30 hopelessly ruined apartments cluttering up the arches have already been torn down; more are to follow soon; and plans are under way to demolish a stretch of unsightly shops below, replacing them with plate-glass kiosks through which passers-by may someday see the whole facade in all its magnificence. By no means everybody thinks this is such a good idea, some suspecting that the Dowager Empress Helen might have been right when she called the place an eyesore. But there will be time enough to argue that out.

With luck, and more money than the austerity-ridden Yugoslav Socialist Republic has in hand at the moment, the entire master plan for restoring the Palace should be completed in the next 20 years. Yugoslavs lucky enough to live in it then might well be not only eating in the personal dining room of Rome's remarkable emperor-god and walking in his very footsteps to catch the sea-breeze, but dancing on his grave (well, almost). There would be nothing quite like it in our day, as there wasn't in his.

Tourists look in on Dr. McNally and assistants while they work on the floor of Diocletian's baths.

A modern dance group changes costumes beneath Tito's picture for a performance in the Peristyle.

Sunlight streams through
an opening in the
dome of the Vestibule.

A Steinway is a Steinway is a Steinway.

There are different sizes. And different prices.

But large or small, when a piano bears the Steinway name you may be certain that it was built to the standard set by Henry E. Steinway 425,000 pianos ago: "Build the finest piano possible and sell it at the lowest price consistent with quality."

From smallest vertical to concert grand, all Steinway pianos are built by the same hands. Regardless of size, they share patented and exclusive features (like Steinway's Diaphramatic® Sound Board). Features which endow the instrument with the Steinway sound.

We make no "cheaper" piano. We make no second-line piano sold under another name. We make only the Steinway.®

And no one else has ever managed to build anything quite like it.

For more information please write to John H. Steinway, 109 West 57th Street, New York 10019.

Steinway & Sons

ELEPHANT

Photographs by Nina Leen
Text by Peggy Thomson

White House can be happy, as its toys reveal

The playthings of Presidential offspring, now scattered, indicate pleasurable moments in the lives of famous children

Over the years the White House has served handsomely as a playground for Presidential children and grandchildren. Its lawns, attics and carpeted stairs invite games of hide-and-seek and capture-the-flag. Its ceremonial rooms and corridors have doubled as race courses for rolling stock—cars, carts, bicycles and skates. Its family quarters have accommodated pillow fights and, along with an abundance of pets, the whole homely clutter of building blocks, dolls, dollhouses, miniature weapons and all the other types of toys that pile up around Presidents who are also family men.

"I know the President had a stormy career," says Margaret Johnson Patterson Bartlett of her great-grandfather, Andrew Johnson. "But the children didn't. The children had a grand time." Mrs. Bartlett, now in her 30th year as a National Park Service employee in Greeneville, Tennessee, guides visitors through the historic Andrew Johnson home (where she herself was born and raised). Among the items she points out are a set of wooden building blocks (opposite) with scenes of beasts and Victorian spectators politely regarding one another through circus-cage bars. As a child, Mrs. Bartlett played with the blocks; earlier they had been the playthings of her father, Andrew Johnson Patterson, during his young years in White House residence as one of the Johnson grandchildren. Mrs. Bartlett recalls her father's tales of Easter egg rolling, of the visit of Charles Dickens and of a magnificent children's supper party.

All the old toys of former White House occupants are scattered now. There has never been a curator to keep a sampling of toys, recording the succession of children, which only five administrations lacked. And, indeed, who would want to be such a curator? Imagine the anguish of trying to persuade a child to give up a prized plaything because it had "historic value." In any case, what would a toy curator look for? Penny whistles? Velocipedes and bicycles tagged with the names of Grant, Garfield, Taft, Coolidge and Hoover? The pocket watch with which Thomas Jefferson entertained his seven visiting grandchildren or the windup toys that were on FDR's desk?

What to show for the hard-playing Teddy Roosevelt gang, to whom books and pet rats, parrots, terrapins and ponies were more toys than actual toys could ever have been? Little Kermit's stilts, perhaps, and Quentin's superior milk-bottle-top collection, the merits of which that youngster discussed with the President.

By good fortune some of the White House toys—like the Johnson building blocks—are saved in Presidential homes and libraries. But many of the toys were either discarded, handed down, given away or disintegrated from the loving they got or from neglect. Some suffered a drastic fate, such as met the little tea set that belonged to the White House's first juvenile occupant, Susanna Adams, granddaughter of John Adams. During a tea party, the cups and saucers were smashed by a playmate—on purpose, according to Susanna. On a return visit Susanna is said to have bitten off the head of her friend's wax doll.

Andrew Johnson's grandchildren played in the White House with this set of wooden blocks, papered with letters and circus scenes. Here they are shown on the carpet of Johnson's Tennessee home.

Big rag baby Sally

When not decapitated, dolls usually fare well as keepsakes for future generations. "Sally, the White House Doll" (see cover), which once belonged to Mary Louisa Adams, granddaughter of John Quincy Adams, will soon be on display in the Smithsonian's Museum of History and Technology. This doll was made by a great-aunt and given to Mary Louisa, who in 1828 was the first girl to be born in the White House.

A cousin who met Mary Louisa when she was 13 said she had a "big rag baby Sally . . . a personage who has served faithfully each subsequent childhood in our family." He added that Mary Louisa seemed to have no "young life." She was taught to read at age three by her Presidential grandfather. Ten years later she was perusing the Bible for the fourth time.

All the dolls on these two pages belonged to the executive household of Benjamin Harrison and are now kept in the Harrison home in Indianapolis. This boy doll sits on a grandchild's high chair.

Fanny Hayes, the lone girl among four brothers in the family of Rutherford B. Hayes, never lacked for "young life" in the White House. She had two large "baby houses" that once stood in the hall of the President's upstairs living quarters. One of Washington's women reporters who visited the place in 1878 described the dollhouses as "agreeable reminders of the presence of children in the White House" and a source of "great delight" to ten-year-old Fanny and her younger brother Scott.

Today, 95 years later, the two dollhouses are on view in the Hayes Presidential home in Fremont, Ohio. One of the dollhouses, a simple frame structure ordered from a White House carpenter for $16, was given to Fanny on her first White House Christmas. The other, an elaborate mansion with mansard roof, chimneys, bays and a central turret (p. 78), was given to Fanny's parents at a Methodist fair in Baltimore. Since all the original furnishings and dolls were lost, the comfortably overstuffed look of the Victorian mansion has had to be reproduced with antique pieces of proper period and scale—including a housekeeper with a ring of keys at her waist.

Benjamin Harrison's grandson, Benjamin Harrison (Baby) McKee, who took up residence in the White House at 18 months when he was still crawling about like a crab, seems to have played with the fashionable dolls (above) which came his way. And quite a lot of them did, including a big French bisque beauty he won in an 1889 fair contest as most popular child in the nation. ("Of course they expected a girl to win," says a spokesman for the Harrison home in Indianapolis where the dolls are displayed, "but Baby edged out all the competition.")

Baby McKee also had a goat, a tent and a constant stream of new toys pouring in from the public. A newspaperman, keeping track of the offerings, wrote: "His pony cart and his favorite French mechanical dog have lately been put aside for a miniature tennis set with which he plays, with a pretty tasseled silk tennis cap on his head." The dolls, which look unhandled, were rarely unpacked from the time the Harrisons moved out of the White House in 1893 until the President's home was opened to the public in 1938.

On the other hand, Frances, the doll (p. 76) named for President Cleveland's wife, is into her third genera-

Nina Leen has collected photographs of toys over a number of years. Peggy Thomson wrote in SMITHSONIAN *last January on the First Ladies' gowns.*

Not really a plaything, the fashion doll at left was sent out by a store to the First Lady with a trunkful of proposed outfits. Above, the dolls—and the crib—were used by Harrison's grandchildren.

tion of strenuously loving attention. For most of her 80 years she has been in the possession of Esther Cleveland Bosanquet, born in the White House in 1893 at the start of her father's second term. (Mrs. Bosanquet, the only child of a President to be born in the executive mansion, is now a socially active octogenarian living in New Hampshire.)

Though there was also a pull-toy lamb with real lamb's wool, Frances captures Mrs. Bosanquet's strongest memory of life in the White House. "We all loved her, my sisters and I," Mrs. Bosanquet remembers. "My daughters loved her, too. And now that I've given her to my niece in Ipswich [Massachusetts] for her children, my daughters say, 'O dear, we do wish we had the doll.' "

Under her white dress, which is "nothing special," Frances still wears her original owner's christening chemise, "an under-shirtie thing," but she is missing a finger, her eyes won't move, and at one stage when she was all in bits, her legs had to be reassembled in a doll hospital. "And then she was almost bald, too, so she has a new wig. I must have let the moths get to her in the attic. I didn't take the best care of her," Mrs. Bosanquet says cheerfully, "but then, she wasn't the only thing in my life."

In the same spirit Francis B. Sayre jr., Dean of Washington Cathedral, keeps in a desk drawer a little wooden tiger (p. 77)—he has replaced its leg cords but he is willing to let the missing ears testify to hard play in times past and 58 years of good service. The tiger was a gift of the Princeton trustees to President Woodrow Wilson on the occasion of grandson Sayre's birth in the White House in 1915. The trustees expressed the hope that the boy would one day study at Princeton. "That tiger was intimately interwoven with my childhood memories," says Sayre. "I played with it a lot and cherished it." Sayre says he appreciated the Princeton gesture, but he went to Williams instead.

Military toys appealed to the impulsive, playful, high-strung Thomas (Tad) Lincoln, who accumulated a small army of beautifully carved and painted wooden soldiers. The President frequently accompanied Tad on walks to Stuntz's toy store on Washington's New York Avenue to pick out the soldiers. Together they discussed their choices with the shop's owner, who also carved the figures. When Tad, aged 12, left the White House after his father's assassination, he abandoned the toy soldiers in a heap on his bedroom floor.

War dominated the youth of Tad Lincoln, who walked to the telegraph office with his father for night-

time bulletins, rode with his father to the battlefields, and bounded in and out of the President's office, disrupting the most grave deliberations. Tad commandeered the real soldiers, camped on the White House lawn, to serve as actors and audience for his little upstairs theater, even as he stole the Presidential specs as a prop for the play.

Tad's favorite doll, Jack, dressed in the regimental uniform of the Zouaves, was so often court-martialed for sleeping on sentry duty, so often executed with Tad's toy cannon, so often buried among the roses to a death march by Tad and his friends on fiddle, horn, comb and drum, that an angry White House gardener, acting on behalf of his rose bed, is said to have convinced Tad to seek a Presidential pardon for Jack. To the visible irritation of Secretary John Hay, who was never amused by the boy's pranks and theatricals, Tad's plea was heard out and a pardon written on official stationery, signed A. Lincoln. (For a subsequent offense Jack was hanged.) Lincoln museum people long to know if Jack or others of Tad's war toys might still exist, tucked away in some family trunk. Tad's toy cannon does still exist and it may be seen in the Illinois State Historical Library in Springfield.

War also dominated the White House adolescence of Curtis (Buzzie) Roosevelt Dall (he later dropped the Dall), who received from grandfather Franklin D. Roosevelt as his 1942 Christmas present a fleet of miniature wooden World War I fighting ships (opposite). "I was 13, a Navy buff such as he was, spending hours in the Smithsonian before those great naval displays of the German and Allied fleets in tactical positions. My grandfather made the gift in some recognition of our shared passion."

The following Christmas the boy received a set of the White House Map Room's World War II ship models, made for recognition classes. "To me they were never really toys," says Roosevelt. "They were collectors' items"—for show on the boy's White House bedroom shelf. Today, his interest in things naval having dwindled, U.N. official Roosevelt has them stowed in boxes, out of sight, in his New York home.

The toys with which Mamie Eisenhower stocked a third-floor playroom for the frequent visits of her grandchildren while her husband was President ran to civilian items like a stuffed bear and a hurdy-gurdy (opposite). Her grandchildren best remember streaking through the downstairs halls in young David's battery-operated Thunderbird Junior sports car, and turning to other play only when its batteries were being recharged in the White House garage.

Recent administrations, it is hoped, have been stockpiling more toys for possible future view along with documents in Presidential libraries. In Austin, the little plush beagle from Patrick Nugent's White House life with Grandfather LBJ is not now on display, though it may yet be. And there's a thought of showing Caroline Kennedy's exquisitely proportioned dollhouse, a gift from General and Mme Charles de Gaulle, in the Kennedy library when it opens in Cambridge, Massachusetts.

An ideal collection of Presidential toys would certainly include young John Kennedy's favorite helicopter, modeled on his father's, which the child carried like a football under his arm. There might even be that pair of ordinary kitchen trays filched by the FDR grandchildren for snowy slides down the "Jefferson Mounds" of the White House south lawn, thereby becoming White House toys touched by history.

Frances, bonneted and barefoot, sits tall on White House lawn. A gift to Grover Cleveland's daughter in the 1890s, Frances has been cherished by successive generations of Cleveland girls.

This huge fleet of model warships still belongs to Curtis Roosevelt, who developed a passion for them during World War II in emulation of grandfather FDR, who once served as Assistant Secretary of Navy.

This wooden tiger, now earless and stringy-tailed, was given to President Wilson's grandson by the trustees of Princeton University. It is shown on a rug in the Woodrow Wilson House in Washington.

The Eisenhower grandchildren had lots of toys, including this teddy bear and hurdy-gurdy, pictured on the White House lawn. Mrs. Eisenhower recalls that the hurdy-gurdy was a great—and noisy—favorite.

This dollhouse, a many-chimneyed mansion made in Baltimore in 1878, belonged to the daughter of Rutherford B. Hayes and is now in the Hayes home in Fremont, Ohio. It is furnished in Late Victorian.

Photographed at Round Hill, Montego Bay, Jamaica, W.I.

More native than
the Limbo.
More exciting than the
beat of a steel drum.
It's Tia Maria,
the essence of Jamaica.
Tia Maria. Jamaica's
haunting liqueur.

W. A. TAYLOR & CO., N.Y., N.Y. 63 PROOF LIQUEUR

Send for colorful booklet containing dozens of Tia Maria drink and dessert recipes. P. O. Box 5077, F.D.R. Station, New York, N. Y. 10022

By S. Dillon Ripley

Some 600 species of birds abound in small Bhutan

This remote kingdom in the Himalayas is a formidable stopping place for a host of avian migrants and only a few ornithologists

Author's party ascends a scree-covered slope. To study bird migration in Bhutan is an uphill battle.

Birds are virtually everywhere and you can study them in your backyard. So there is something a bit suspicious when someone says he *must* go all the way to Bhutan to study birds.

For one thing, Bhutan, a remote kingdom in the Himalayas, is closed to most foreigners. At the moment, it has diplomatic representatives only in New Delhi and at the United Nations in New York. To go there is an obstacle race of the sort beloved by "country collectors," the people who travel to far-off places to enhance their prestige. Any country collector worth his label-covered baggage would sacrifice as much to visit Bhutan as a stamp collector would to buy a rare upside-down airmail stamp.

But to me Bhutan represents another kind of challenge. Years ago, with an Indian colleague, Dr. Sálim Ali, I began work on a ten-volume handbook on all the bird species of the subcontinent of India, Pakistan and the neighboring countries which lie along the Himalayas. Bhutan was the one country in the region that we had never visited, and it turned out to be one of the most interesting.

Though only about the size of Switzerland, it has an almost unheard-of variety of birds. Nearly 600 species, which is almost as many as in all of the United States, are packed into a jumble of mountains which rise ridge after ridge like a washboard, reaching a height of more than 20,000 feet near Bhutan's northern border with Tibet.

The birds of Bhutan are known primarily because of a long trek across the country made in the 1930s by Frank Ludlow, a British political officer who was a keen amateur botanist and ornithologist. His report detailed several hundred species of birds, and gave many of the first scraps of information on their ranges, but added little knowledge of the birds' breeding habits or migratory patterns.

In fact, Bhutan is one of the best places anywhere to watch bird migration over high mountains. It is one of the few areas in the world where the mountains run east and west for such a distance at such heights, making migration a particular challenge.

Each fall, vast waves of birds must hurtle themselves over the mountains from the northern highlands of central Asia, down to the arid southern plains of India; each spring the course is reversed. Larger ducks and geese like the ruddy shelduck and gray lag goose may nest in Manchuria, cross Himalayan passes and

winter in Rajasthan in western India more than 2,500 miles away. Migration of smaller species like the leaf warblers may vary from a few hundred miles to more than a thousand, even though each day's flight may be relatively short. No one knows just how long the various species take to complete their journeys; it could be more than a month for small birds like warblers, and possibly only a few days for larger species. To get where they are going, these myriads of birds must funnel through the high passes, saddles between the great peaks of the east-west chain.

The dips of these high passes beckoned me as well as the birds. One autumn not long ago my wife and I stood just on the north side of a pass. At 16,000 feet the north slopes tend to have a low scrubby growth, while the south side is largely bare with rock screes covered with moss and an incrustation of wild flowers or creeping shrubs. Edelweiss grew there and late primroses and occasionally a blue poppy. The north slopes hold the snow and so achieve a milder, more balanced climate: The southern slopes, ravaged by the wind and sun, are less sheltered, except in occasional gullies, and so they are more barren.

The southwest monsoon was blowing steadily: It was almost the end of the summer windy season. Scudding clouds steamed up the pass behind our backs, pouring over the ridge like trails of smoke. Now and then it rained. Sometimes there was a slushing fall of very wet snow. The air space was full of birds, mostly small gray-brown warblers, flying north. But why north? It was mid-September, early afternoon and rainy. Where were they going?

Seesawing over the passes

The answer seems to be that the smaller birds perform a lot of extraneous maneuvers. The image of migration as a continuous journey may apply mainly to large birds with superior powers of flight and endurance. Cranes, perhaps one of the most powerful of migratory birds, have been spotted flying at more than 20,000 feet. These birds are capable of rising even higher on ascending air thermals to cross the Himalayas, proceeding with regular, seemingly effortless wingbeats for several hundred miles at a stretch. Only a few birds like the swans and the largest eagles and vultures can match this kind of flight. Thus, the cranes of Europe and North America move from north to south for a 2,500-mile trek, stopping perhaps at only a few favored places, unless there are violent changes in the weather or prevailing winds.

But with the smaller, perching birds it is very different. In the plains or flat coastal areas of the United States a change in temperature or other weather factors often delays or reverses migratory patterns. In the woods and swampy fields of New England I have watched warblers moving northeasterly on a balmy October day with a following southwest wind. By evening, having fed aggressively during daylight, they may switch when the wind dies and fly south again, making up with a zigzag for the distance lost during the day. The flight during the night hours may bring them a hundred miles south of my Connecticut swamp by daylight.

But at 16,000-20,000 feet that process becomes far more hazardous. At night, the moon comes out, the ridges sparkle in the damp light, the wind dies and the traffic reverses. The air is full of shrill cheeps and twitters as birds fly south, just over the bushes.

Is there enough food to go around? How many warblers can afford to seesaw back and forth over a succession of these passes?

Birds store energy in the form of a subcutaneous

layer of fat, or fatty deposits close to the main wing muscles, which can be absorbed just as food is absorbed, providing energy which, with rapid breathing and enriched oxygenated blood, can be used in flight like a sip of sugared water by a long-distance runner. I think that the seesawing mode of progression is probably the only way they can manage.

In spring and fall there are flushes of insects. In April the air is abuzz in daylight along the watercourses with flights of midges and other flies. The edges of stones and the moss cover abound in ants, small beetles, springtails and vernal bees. In September and October the insect floods come again. Moths and butterflies are on the wing, fluttering from projecting rock to projecting rock. Spiders are busy, as are ants and beetles, gathering food for the winter. Bumblebees crawl over the tiny plants.

Also, many bushes have proliferated berry crops. Where the berries are hanging on barberries, viburnums and vacciniums, the bushes sometimes bend under the weight of birds—ravenous thrushes, chats, finches—so busy that they seem indifferent to human presence. Ludlow, who preceded Sálim Ali and us to Bhutan and southeast Tibet, spoke of hordes of thrushes (cousins of our American robins) lighting on berry-bearing shrubs, breaking the branches with their weight and devouring every last berry in a mad scramble as if life depended on it. Indeed, life itself *is* at stake and this is seldom more dramatically demonstrated than along these high ridges.

Migration was all around us. The pass over which we had come had a sharp knifelike ridge that wheeled round to the north in an S-bend before it resumed its east-west thrust. Taking advantage of the ascending warmer air currents, a long ribbon of hawks swept toward us from the north. For them the ridge is a kind of funnel. To reduce stress, hawks and vultures seek out ridges along the edges of which they can skirt, planing with nearly fixed wings on the updrafts—a great energy saver.

We watched attentively as a line of big northern kites (opposite) swept effortlessly, lazily along—no struggle, no strain. But no; one kite suddenly broke the pattern and with a flick of its large volplaning wings and tail, dived down to the rocks of the ridge a hundred or more feet below. This is the same maneuver that the kite sometimes performs over a garbage dump in an Indian city miles away in the southern plains during the winter. But this time, to my wife's and my surprise, the target was living birds. Unbeknownst to us from where we stood on top of the ridge, a solid flock of finches, hundreds strong, was sitting inconspicuously below the ridge. Suddenly they were all up in the air as the kite struck at them. He swung and twisted violently from side to side, but seemed to miss.

What were these finches? In order to identify them, I had to have a specimen. Shooting a few is the only way to identify these species, for nets would never catch them. Swinging my collecting shotgun I fired at the flock. It was already much too high but at the reverberation at least 1,000 more finches rose off the nearby rocks and, for a moment in the driving clouds, the air was awash with birds and I heard the flapping of their wings.

I fired again. Down went a bird from a hundred feet. I marked it in the tangle of bushes and hobbled over the broken ground, hoping against hope that it had landed in the open. Fortunately our Bhutanese

Secretary Ripley, who wrote of the extinction of animal species in SMITHSONIAN, *February 1972, returns this month from his fourth trip to Bhutan.*

A local bird is Blanford's rosefinch. Its habitat is often overrun by more numerous migrants.

A black kite is one of the large birds that plane with seeming ease along the high ridges on updrafts.

guides had eyes that could find needles in haystacks. One of them leaped over the rocks like a hare and found it.

It was identified as a type of Brandt's mountain finch, known to nest in Tibet and west China, on its way to the cultivated grainfields of the lower mountains at 8,000 feet. So that is how they travel. Now we know. We can say we have seen it.

No one has studied these mountain finches in migration. Ludlow missed them. But a British ornithologist, the late Colonel Richard Meinertzhagen, traveling in Sikkim to the west of Bhutan in 1952, came across a large mixed flock of mountain finches. Among this flock was a straggler—a member of a very pale race of Brandt's mountain finch—reported for the first time in our Indian region since their discovery on the Russian-Chinese border in 1909.

The fascination for me in all of this is the fact that almost all the birds we saw were moving somewhere. Then where were the resident species? What birds live there? By searching we finally found some, perhaps representing a mere 30 species all told—warblers, thrushes, choughs (a kind of mountain crow), a wren, accentors, titmice and a few marginal species that fringe the higher area in low trees. I exclude larger birds like the hawks which have such a wide altitudinal range as to mask any differences between migrant and resident species.

One resident is a bluefronted redstart, a small thrush with a blue forehead, about the size of our bluebird (see p. 84). In autumn, while descending from its high breeding grounds, it moves about in small loose parties, unlike the more solitary white-capped redstart.

There is a dusky leaf warbler too, a skulking little fellow, again seen in pairs or with one or two young (see p. 84). It bears no relation in numbers to the hordes flying by, over or through the underbrush. There is the wren (same species as the North American winter wren), usually seen singly or in pairs, the size of the small warblers. There are local finches, such as Blanford's rosefinch (opposite) or Hodgson's mountain finch (see below), but they are few in number, nothing like the vast flocks of migrant rosefinches or mountain finches.

My theory is that the locals cannot compete; their numbers are few and their broods small. The migrants keep them that way. The pressure of migrants produces a competition that results in what might be called competitive exclusion: The locals can just barely make out when the food is grabbed each spring and fall by the numerous transients. The local birds must not leave too many young. If they are to get by they must keep their own numbers low.

Are these observations worthwhile? Is there any significance to what we can find out as we plod over these ridges, soaking wet, making camp in a cloud

Gregarious and restless, Hodgson's mountain finch is seen in wintertime flocks of up to 200 birds.

The bluefronted redstart is a resident of the high areas, frequenting rocky, grass-covered slopes.

and hoping to dry out in a day or a week? Why, indeed, go to Bhutan?

But if no one goes to these high mountains, then they and their fauna must remain unknown. Since the Mt. Everest expeditions of the 1920s and 1930s, only a few German, American and British ornithologists—and now my Indian colleagues and we—have traversed these higher alpine slopes during migration. And this is an arc—from Nepal through Sikkim and Bhutan to northeastern India—of about a thousand miles. But observations at these heights are disheartening. Like the far north, the hardships in the high mountains provide only tantalizing glimpses.

Just to come into these mountains requires a week or more of arduous riding on horses or yaks. In a day's travel over the mud-filled ruts that pass for roads, perhaps 6 miles will be traversed, certainly less than 12. The ups and downs, now up to a ridge, now down again to a river, a foaming torrent crossed by a plank bridge, projecting out over the stream without guardrails, is an exhausting trek. Without animal transport it would be impossible, for not enough human porters are available and tents, bedding, food and kerosene lamps with fuel must all be carried.

The dusky leaf warbler hugs the ground, outnumbered by the avian hordes passing through its territory.

Yaks are skittish and timid, and don't seem to like strangers. They sometimes balk and throw you or their load off. Inevitably there is no place to go but down. My wife Mary was thrown off into a gorse bush when one of the Bhutanese ran toward her mount suddenly. I was once thrown off—most painfully—on my knee. Another time I dismounted before crossing a bridge only to have my yak jump off the bridge into the stream below. On one trail, so narrow that a single plank had been fastened with pegs to the side of the hill to make a path, one of our yaks tried to butt off its load while charging the rest of us. To my horror it started ramming Mary's yak which turned at right angles up the hill, hindquarters slipping off the plank towards oblivion below. Fortunately it held

ON JANUARY 8, 1975, THE VIKINGS SET SAIL AROUND THE WORLD.

BOTH WAYS.

Vikings have been making history at sea for centuries.

On January 8, 1975, they do it again.

For on that morning, the *Royal Viking Sea* sails from New York on a 94-day voyage around the world, westbound via the South Pacific. (From Fort Lauderdale January 10.) And on that afternoon, the *Royal Viking Sky* sails from San Francisco, also bound around the world. But in the opposite direction, via Japan. (From Los Angeles January 9.)

Both ships are sparkling new and first class throughout. Both are built strictly for cruising, with features like single seating at each meal, outside staterooms for 94% of passengers, a continental crew numbering more than three for every five passengers, and superb international cuisine. Both are of Norwegian registry—and spirit. And both are going to places like Bombay and Bali, Singapore and the Seychelles, Rio and Durban.

But both are sailing on the same day. So you'll have to choose one. The *Royal Viking Sea* westbound via the South Seas. Or the *Royal Viking Sky* eastbound via Japan. It's a difficult choice. But not an unpleasant one. (To further complicate your decision, the *Royal Viking Sky* is also sailing around the world a year earlier, leaving the West Coast January 22, 1974 and Ft. Lauderdale February 5, 1974.)

Your favorite travel agent is always a big help in making decisions like these. And also reservations. Call him. Or us: 800-227-4246 toll free (N. Cal. & Can., 415-398-8000, collect; S. Cal. 213-627-1365, collect).

To: Cruise Consultant, Royal Viking Line,
Dept. D-87, One Embarcadero Center,
San Francisco, Cal. 94111.

Please send me your 92-page book in full color with full details on your Around the World cruises, as well as all the other Royal Viking worldwide cruises. ☐ Also, your brochure on the 1974/ Round-the-World cruises.

Name_____

Address_____

City_____ State____ Zip____

Travel Agent_____ City_____

ROYAL VIKING LINE

its position without falling and she managed to slide off. Meanwhile with shrill screams we tried to change the yak's direction. It was frightened and there was nothing to do but send it back to its own herd in the village of Laya.

No, travel in inner Bhutan is still not for the country-collector. There are no jetports, no hotels, and not even jeeps to drive in. Yet nowadays there are perhaps only one or two other places—in the tropics of the eastern Andes, for example—where we have so little basic distributional data about land birds. Such quests for birds in remote areas sound a bit like voyages of the 19th-century naturalists, but when we can find a ready-made field laboratory such as the mountains of Bhutan in which to study high-altitude migration, it is worth coming half way around the world. Bhutan might provide answers to population ecology problems which perhaps cannot be studied elsewhere than in the Himalayas.

And in spite of the rain and the cold, wet clothes, hysterical yaks, leeches by the score and headaches and sore backsides, we know that we would give anything to go back to the high mountains to hear the whistle of wings and to see the wind blowing the clouds away to show the snow peaks, so clear in the sparkling air that you believe you can reach out and touch them.

The author's wife struggles with a recalcitrant yak, one of the many hazards in Himalayan research.

On rare occasions, when the damp, cold clouds clear, a mountain camp can seem like Shangri-La.

By Kurt R. Stehling

World-shaking week in December

Methodical work in a laboratory near Berlin and a walk in the snow in Sweden opened the Pandora's box of fission only 35 years ago

By modern standards, the apparatus in Otto Hahn's laboratory (preserved in the Deutsches Museum in Munich) seems quaint, yet it sufficed to determine for the first time the products of nuclear fission.

It was gray and snowy 35 years ago on December 17, when a short, stocky man named Fritz Strassmann pedaled his bicycle up to the pillared facade of the Kaiser Wilhelm Institute for Chemistry in Dahlem, a suburb of Berlin.

The institute's most noteworthy architectural feature was a rather ludicrous spire that resembled a *pickelhaube,* the spiked helmet of the German army in World War I; the institute's most noteworthy scholar was Otto Hahn, its director and the world's most respected radiochemist. Fritz Strassmann was Hahn's research associate and just as he dismounted from his bicycle, Hahn himself arrived in a taxi.

The two men entered the institute and Hahn went directly to his spacious office on the second floor of the west wing. Strassmann continued on to their large, well-equipped chemistry laboratory and called down the hall for the two laboratory assistants, Fräuleins Lieber and Bohne. The three of them organized their apparatus and checked the leads of the electrical equipment. Shortly thereafter Hahn entered and, around the blackboard, they discussed the results of the last few days—unaware that they were about to take steps that, within a period of a week, would produce one of history's most earth-shattering discoveries.

Along with a relative handful of researchers elsewhere in Europe and the United States, the Hahn group had been bombarding uranium with neutrons. It was only 40 years after the discovery of radium, and radioactive elements were the subject of intense study as scientists tucked away in various institutes probed the nature of matter and the structure of the atomic nucleus. Earlier studies had shown that the nucleus was not a single unit of matter but a collection of positively charged particles called protons and, as had been discovered only six years earlier in 1932, of other particles bearing no electrical charge—neutrons. And, only months after their discovery, neutrons had been put to use as tools for probing even more intimately the behavior of the nucleus.

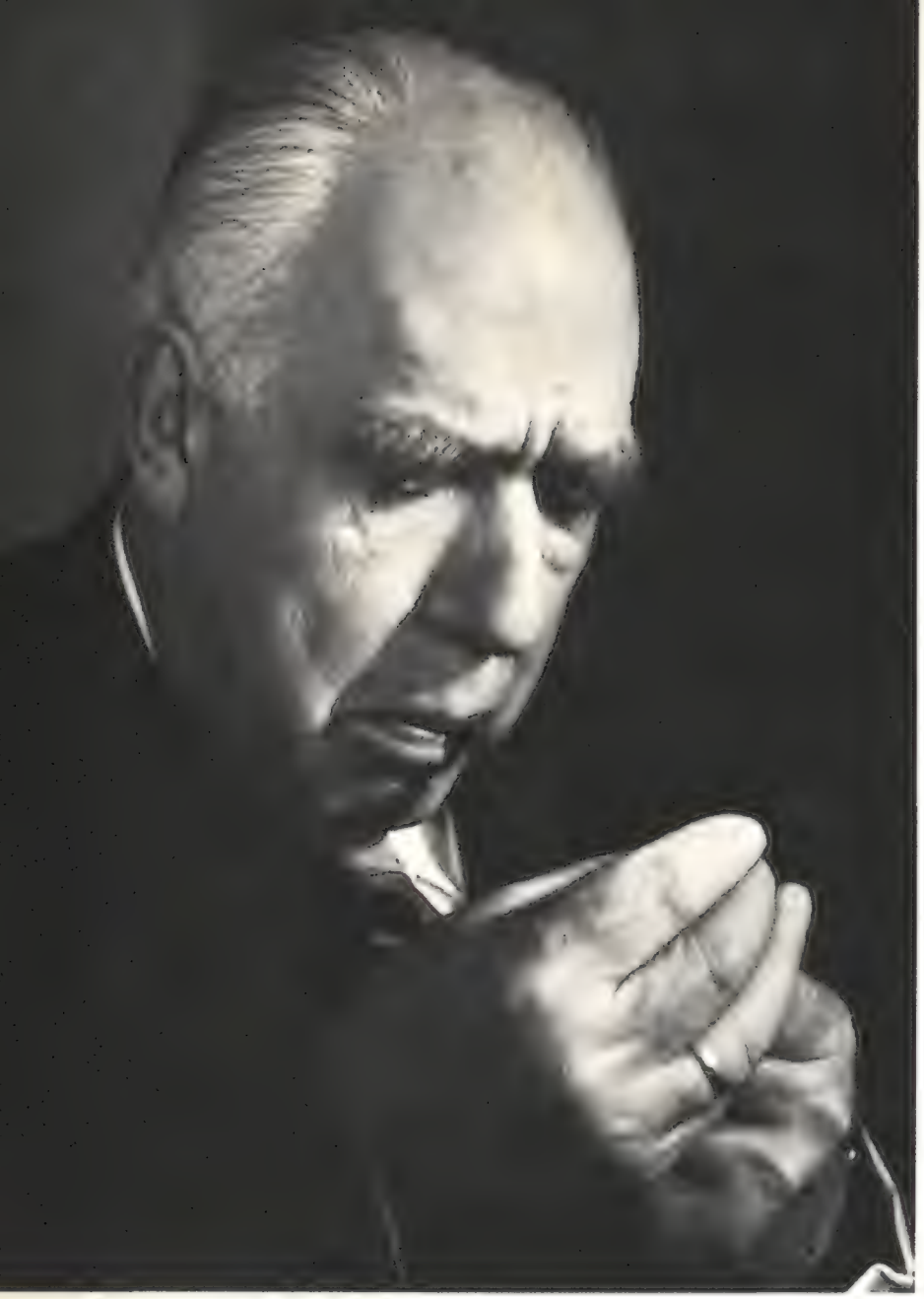
Having no electrical charge, neutrons could easily strike the nucleus without being repelled by its positive charge. In 1934, the Italian physicist Enrico Fermi had begun bombarding elements with neutrons, experimenting with most of the 92 elements, including uranium, the heaviest natural element (in its most plentiful form, or isotope, uranium has an atomic number of 92, which means it has 92 protons and 92 neutrons in its nucleus). Fermi used neutrons that had been slowed down by having them pass through paraffin wax (this increased the chances of interaction with the nucleus).

He concluded that when the particles struck a uranium nucleus they would stick to it and produce a heavier nucleus—thereby converting it to heavier artificial elements he called transuranic. Or, it was thought, neutrons might chip off, so to speak, a small bit of the uranium nucleus and produce elements just below uranium in terms of atomic weight.

Similar experiments were being carried out in Paris by the daughter of Madame Curie, Irène Joliot-Curie, and her Yugoslav research partner, Paul Savitch. While trying to isolate chemically the products of this neutron bombardment, they found a number of peculiarities. For example, one of the resulting products *seemed* to resemble the element lanthanum. But lanthanum, which has an atomic number of 57, is 35 elements removed from uranium in the Periodic Table of Elements.

There is a subjective factor that intrudes into even the most precise experimental science. Like others, Curie and Savitch expected to find a transuranic element or at least something very close to uranium in the Periodic Table, and so they called this lanthanumlike element a transuranic element in spite of its curious characteristics. This turned out to be one

Radiochemist Otto Hahn believed his results
even though they challenged the rules of physics.



Niels Bohr, the Danish physicist, slapped his head at the news and quickly alerted American scientists.

of the great near-misses in the history of science.

On December 17, 1938, the Hahn group in Berlin was determined to resolve once and for all what the ambiguous products of neutron bombardment were. In a series of experiments they had clearly identified—or so they thought—transuranic elements and three radioactive isotopes of what seemed to be radium, which has an atomic number of 88 and is located four elements below uranium on the Periodic Table. The next step was to verify the identity of these puzzling "isotopes" by chemical means. They were unprepared for the momentous event that occurred that evening.

Under Hahn's direction, Strassmann had been doing the tedious work of precipitating and crystallizing the elusive products of the neutron bombardment. They were puzzled by the stubborn presence of a small lanthanumlike fraction. But they were astonished to find yet another by-product—one that seemed to resemble barium. (The atomic number of barium is 56, far away from either uranium or radium.) This was wholly unexpected.

In their chemical analyses, they actually used barium salts as a carrier or scavenger to remove what they thought to be the radiumlike product. But instead of separating from the barium carrier the way a radium-like element would, the product seemed to accompany the carrier into the receiving test tube.

Strassmann recalls that at about 10 that evening he and the two assistants set about rigging sensitive lead-shielded Geiger counters with their tiny open apertures pointed at the small, thin-walled dish into which the barium carrier and the "x" substance would be decanted. By 10:30 everything was in place. It was cold in the unheated, tiled laboratory and so still that only the occasional clicks from the Geiger counters picking up stray background radiation could be heard. Strassmann sat next to the worktable making methodical entries in the lab notebook.

A drastic occurrence

Now Hahn moved in. Grasping a small flask with delicate tongs, he emptied its slightly bluish solution into the Geiger-scanned dish. The group tensed, expecting to hear the frantic chattering of the counters as they picked up the radioactive emissions from the mysterious substance in the barium salts.

Nothing.

The only sound was a slight amplifier hiss and a small increase in the radiation count—too weak to be emanations from a radiumlike product.

No one spoke for a couple of minutes while the significance of the low radioactivity sank in. Perhaps it was because they were working with only a few thousand atoms of radioactive material. But further chemical analyses were done, confirming that *there was no radiumlike product from the uranium solution's neutron bombardment. Instead the product was a form of barium.* Something happened in the nucleus to produce an element located about halfway in the Periodic Table of Elements.

Hahn and Strassmann sensed that a drastic occurrence might be convulsing the uranium nucleus, but they were hard put to give an exact explanation for what they had discovered. In fact, despite their seemingly positive identification of barium, Hahn cautiously wrote in his notebook, "Barium has apparently been isolated."

To get verification and a full explanation, Hahn's instinct was to turn to his friend, former protégé and longtime colleague, Austrian physicist Lise Meitner. Unfortunately, he could not just walk excitedly across the corridor to her laboratory as he had done so often during the 30 years they had been collaborating. The Nazi Anschluss in Austria some months before had removed the protection of her Austrian citizenship and as a Jew she would have soon been on the Nazis' blacklist. Therefore, with Hahn's help, she had escaped via Holland to a teaching position in Stockholm. Meit-

ner and Hahn had been corresponding regularly, and she had encouraged him to verify or disprove the Curie-Savitch experiment.

On the evening of December 19, 1938, Hahn composed a letter to Lise Meitner. He told her that the substances he had just produced behaved exactly like barium and could not be separated from it. Then he stated rather hesitantly that one of these "radium isotopes" that had the chemical properties of barium very probably was barium. He asked whether she had any "fantastic" explanation, since he doubted whether the uranium nucleus could burst into barium. Hahn was well aware that the accepted theory of physics of that time had not yet considered the idea that a nucleus could be split.

Miss Meitner got Hahn's letter on December 20 (it was a time when such postal miracles still existed). She replied on the 21st. She was naturally puzzled and astonished that Hahn's findings should show such a light element, which she realized could only result from the nucleus breaking apart.

She asked whether Hahn had considered other alternatives, suggesting several possible by-products of this neutron bombardment and several substances that might behave just like barium. Understandably, like Hahn, she was reluctant to accept such a stunning deviation from years of work with radioactive elements. And, after all, while the evidence was substantial, it was still based on the work of one group, and that group was working with microscopic quantities of radioactive substances.

More midnight oil was burned at the Kaiser Wilhelm Institute during these days. On Thursday evening, the 22nd, Hahn made a positive statement in his diary that "the work with barium determination is finished." He and Strassmann had demonstrated to themselves, without any doubt, that barium resulted from the bombardment of uranium with slow neutrons and, furthermore, that another element, lanthanum, appeared in recognizable form. This explained the Curie-Savitch finding which they, Curie and Savitch, had rejected!

With Fritz Strassmann, Hahn immediately prepared a paper which he sent that same evening to *Die Naturwissenschaften* (*The Natural Sciences*), a German weekly journal which agreed, thanks to Hahn's reputation, to accept the paper on short notice, with quick publication promised.

Before he sent the paper, Hahn again wrote Lise Meitner. He wrote of his nostalgia for the happy days working with Lise, and he told her how he missed her

Lise Meitner, in exile, wrote in the snow and leaped to the realization that the nucleus could split.

expert advice when it came to nuclear matters. He said that positive proof now existed of the barium's existence and pointed out, as he did in his scientific paper, that lanthanum was also produced.

Hahn's letter arrived just ahead of Lise's nephew, Otto Frisch, the son of her sister, who had come to visit her over Christmas. Lise and her nephew had been accustomed to spending Christmas together in Berlin; this year she had been invited to visit friends at a seaside resort near Gothenburg and had asked Otto to join her there.

Otto Frisch was a bright young physicist who had left Germany in 1933. He had worked in London for a year and then was invited to work with Niels Bohr in Copenhagen. Frisch had already made a name for himself with his own work in neutron bombardment of certain elements.

When Frisch met Lise in the village of Kungälv, she was brooding over the letter from Hahn. Without comment, she gave it to him to read. Otto was a little impatient with his aunt but humored her in discussing the letter. He had come, not only to keep her company during her first holiday in exile, but also to discuss a research project of his own that he was planning

Dr. Stehling, a science consultant and an advocate of balloon astronomy, based his article on personal communications with many of the scientists mentioned.

Hidden in Africa, a 4,000-year-old culture called Ethiopia.

We've been here with our castles and churches, our paintings and jewels, our rare wild life and birds for centuries. Hidden by natural barriers. Now the treasure chest is being opened. Call your travel agent or mail the coupon for information about the Hidden Empire.

ETHIOPIAN AIRLINES 200 E. 42nd Street, Dept. W-5
New York, N.Y. 10017 Tel. (212) 867-0095

Name

Address

City State Zip

ETHIOPIAN AIRLINES
The key to the Hidden Empire

French radiochemist Irène Joliot-Curie participated in a historic near-miss.

at Bohr's institute. Also he had hoped to get in some skiing.

To Frisch, it simply seemed too difficult to believe barium could be produced in the manner Hahn described. They decided to walk outside in the snowy woods to get some fresh air and talk the matter over. The two physicists walked up and down in the snow, the 34-year-old nephew wearing skis and his 60-year-old aunt on foot.

Suddenly they struck upon the answer. If the uranium nucleus did split, it would release large pulses of energy which could be detected by the proper apparatus. They realized that some of the mass would be destroyed and turned into energy. This would be in accordance with the famous principle enunciated by Einstein. Even a minute amount of mass would, on disintegrating, produce enormous amounts of energy.

Meitner and Frisch sat on a log and scratched formulas in the snow and on a piece of paper they had with them. Later that morning they worked out what energy levels could be observed when a uranium nucleus split.

All the experimenters who had been bombarding uranium with neutrons had been splitting atoms without realizing it —perhaps because they were not looking for its products or the energy pulses that would have resulted. It had taken first-rate radiochemists to identify unambiguously the by-products of nuclear splitting and, by doing so, to force upon

Send for this FREE record and learn how to speak a second language!

Send for a free Linguaphone Record and believe your ears.

Linguaphone will teach you a new language through the natural method of learning:

First you listen, then you understand, then you speak. It's the same method you used as a child to learn English.

Why not believe your ears? Our free record will prove to you that learning a foreign language is easier than you think.

Send for your free record now. There is no charge, no obligation at all!

FREE RECORD AND FOLDER

Linguaphone Institute, Inc. Dept. 5002
100 Park Avenue, New York, N.Y. 10017

I want to learn a new language quickly and easily, right in the privacy of my own home. Rush my FREE record to me, plus an illustrated folder that gives a complete explanation. I understand no one will call, and I will be under no obligation.

☐ Mr.
☐ Mrs.
☐ Ms.

Address

City

State Zip

Please mark appropriately: I am most interested in:
☐ French ☐ Spanish ☐ Italian ☐ German

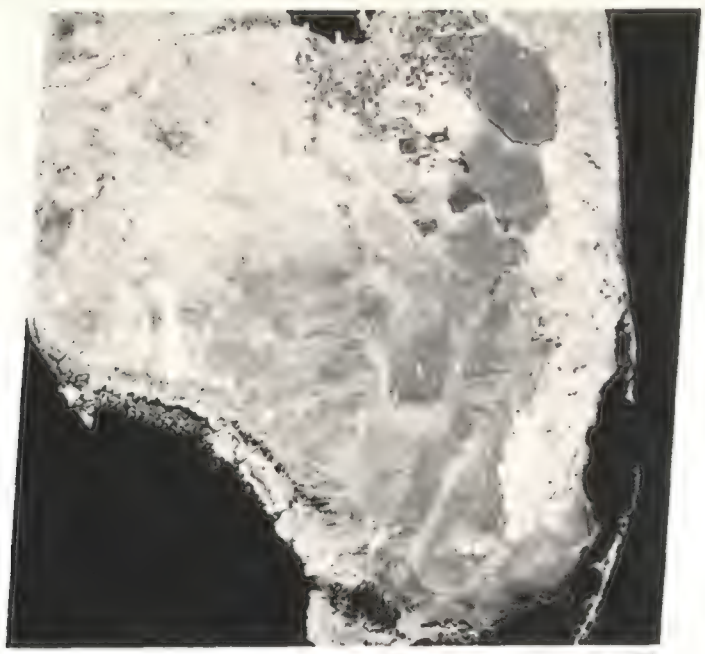
☐ Other

Linguaphone for Languages

A Service of Westinghouse Learning Corporation

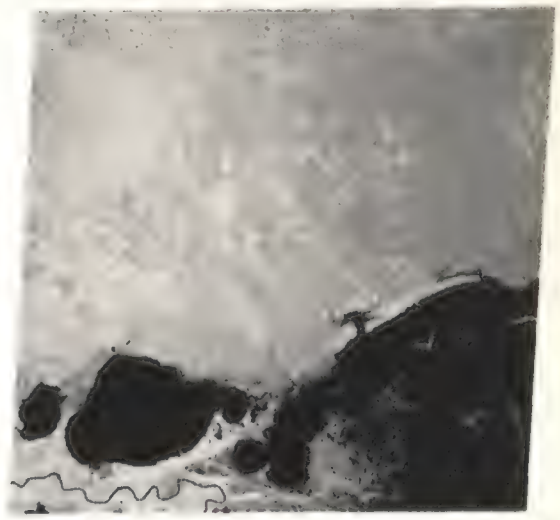
The cost of this advertisement is borne by Eastman Kodak Company

Taxpayers, you have invested in the space program. Now benefit from your investment.



Miami and environs, 22 March 1973

New Orleans and environs, 7 August 1972



Mississippi delta, 7 August 1972

The U.S. Geological Survey, which runs the EROS program (Earth Resources Observation Systems), points out an opportunity to serve the public interest by calling to your attention that imagery is now available of just about any region on earth, except within some 900 miles of the poles.

Everywhere else, NASA's ERTS (Earth Resources Technology Satellite) goes over every 18 days 567 miles high, looking down in four wavelength bands: 0.5-0.6 μm, 0.6-0.7 μm, 0.7-0.8 μm, and 0.8-1.1 μm. Anybody–grade school teacher, ranch broker, botanist, Cub Scout–with $1.75 to spend can have a 9″ x 9″ print of any place selected. The 9″ x 9″ will encompass 115 miles x 115 miles. Changes may be apparent from the previous pass.

For the sake of preserving the earth's glory, let's learn how to look through mankind's new microscope-in-reverse. Let's assume that if Aristotle and his friends had had even ordinary microscopes, we'd all be happier today.

San Francisco and environs, 4 April 1973

Details:

A quick way to get a look through that great new reverse-microscope in the sky is to phone 605-594-6511 between 7 a.m. and 7 p.m. Central Time. Tell what geographical area interests you and what you have in mind. You will be talking to a helpful, well-informed, and quite real person. His or her hand that isn't holding the telephone will be in contact with heavy computer power.

The computer will even know how much was under cloud each time ERTS passed over the region of interest. It might even report that the area was photographed in 1936 and that, if you'd rather have that black-and-white shot from 5,000 feet instead of infrared "false color" from 567 miles, you can so order. Or you might be told the same place was photographed by a Gemini astronaut with a hand-held camera or by completely automatic equipment from Skylab this year, and how would you like *that?*

The EROS price list reflects just the cost of reproducing the photographs. (The cost of the satellite is more widely shared.) A 40″ x 40″ color enlargement on paper, for example, is priced at $25. To avoid misunderstanding, you can take down the numbers of possibly interesting pictures and check them out on a microfilm browse reader at any of 19 locations in the U.S.A. before placing your order. Black-and-white copy negatives or color internegatives can be ordered if you wish to do your own printing. No copyright worries.

If you want to experiment with the color rendition of the bands to emphasize certain signatures, come in person any business day from 7:45 a.m. to 4:30 p.m. to EROS Data Center, 14 miles northeast of Sioux Falls, S.D. Scientific staff members are available there for consultation on instrumentation and interpretation problems.

Don't expect much, though, by way of direct interpretation. *That* the customer does, or consultants the customer may engage, assisted by a fast-growing literature. Aerial photography and the interpretation thereof are not leaving the private sector. On the contrary, those in the business welcome EROS as a tantalizer to swarms of new prospects.

EROS Data Center can also be queried by mail (ZIP 57198).

An article in *American Scientist 61:*175 can take you farther into this fascinating subject. Address reprint requests to Eastman Kodak Company, Dept. 55W, Rochester, N.Y. 14650. But get in touch with EROS, not Kodak, if you want a picture of the old home town from 567 miles up.

You have heard of self-fulfilling prophecy? Its converse, self-denying promise, may threaten if this advertising proves too successful. There must be a limit to how many inquiries a day can be handled in the manner promised here.

Collect American history

Share Paul Detlefsen's "Memories"

The original of this nostalgic work is valued at $40,000. Now for the first time the beloved painter of Americana has permitted us to reproduce it on fine Ridgewood china especially for collectors. His brilliant colors have been captured with perfect fidelity, a feat that took 18 months to achieve. It is, of course, a Limited Edition—only 4,000 will be sold—and it is the first in a series of ten plates.

10½ inches in diameter; $40.00 postpaid and insured; California residents add 5% sales tax. The second in the series, "Coming 'Round The Mountain" will be available early in 1974. Bank Americard and Master Charge accepted or send check directly to Copenhagen Galleri, Dept S, Hamlet Square, Solvang, California 93436. Phone (805) 688-4422.

Save a child. It's the most natural instinct in you.

Since 1932, Save the Children Federation has been helping children round the world to have better lives. Because of people like you. Educated, involved, and in touch with your own hearts. If you haven't already, won't you please fill out the coupon and mail it today.

I wish to contribute $15 a month to sponsor a ☐ boy ☐ girl:
☐ **Where the need is most urgent** ☐ Africa ☐ Appalachia (U.S.) ☐ Bangladesh
☐ Chicano (U.S.) ☐ Europe ☐ Indian (U.S.) ☐ Inner Cities (U.S.) ☐ Israel ☐ Korea
☐ Latin America ☐ Middle East ☐ Southern Black (U.S.) ☐ Vietnam
Enclosed is my first payment: ☐ $180 annually ☐ $90 semi-annually ☐ $45 quarterly
☐ $15 monthly ☐ Instead, enclosed is my contribution of $_____.
☐ Please send me more information.

NAME _____ TEL. NO. _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____
(Contributions are income tax deductible)

SAVE THE CHILDREN FEDERATION
345 East 46th Street, New York, N.Y. 10017 SM 12/3

the physicists a revision of their rules.

Lise Meitner and Otto Frisch spent three days together that Christmas. Then Frisch hurried back to Copenhagen in time to see Niels Bohr off to America. Bohr immediately recognized the significance of what Frisch told him—he struck his head with his hand when he heard the news—and once in America he alerted the U.S. physics community to the Hahn-Meitner discovery and theory. (Hahn's paper appeared in Germany on January 6; the Meitner-Frisch paper in England on February 11.)

Back in Copenhagen, on January 15, 1939, Frisch repeated the Hahn experiment, not only with an oscillograph but with the knowledge of what to look for. He demonstrated for the first time that nuclear splitting is indeed accompanied by a huge burst of energy, and he coined the term "fission" for the process (because it seemed similar to the way bacteria divide). By March, the pioneering work of Hahn, Strassmann, Frisch and Meitner that appeared in the scientific journals was followed by an avalanche of publications on fission and the possibility of a chain reaction in which the energy produced by fission could be used to cause additional fissioning.

On August 2, little more than a half a year after the nuclear Pandora's box had been almost accidentally pried open in Hahn's quiet laboratory, the gentle dean of physics, Albert Einstein, was persuaded by his colleagues to sign a carefully composed letter to President Franklin D. Roosevelt. The letter, which was not delivered to the President until some two months had passed, made no mention of

Austrian physicist Otto Frisch proved the theory and coined the term, fission.

New poems by
Loren Eiseley
THE INNOCENT ASSASSINS
Illustrated by Laszlo Kubinyi

"He has given us the poetry of ancient beginnings and today's pregnant echoes of the distant past."
—HAL BORLAND $6.95

Dorothy Michelson Livingston
THE MASTER OF LIGHT
A Biography of Albert A. Michelson

Story of the man who measured the speed of light, with personal reminiscences by his daughter and many colleagues. Illustrated. $12.50

David Hamilton
TECHNOLOGY, MAN AND THE ENVIRONMENT

What technology is, what its effects are on everyday life, how it is changing the world, and the problems it brings. Illustrated. $9.95

Lennard Bickel
RISE UP TO LIFE
A Biography of Howard Walter Florey Who Gave Penicillin to the World

The vivid and dramatic story of a man whose life and work affected the welfare of the whole world. Illustrated. $9.95

Vincent Serventy
THE SINGING LAND

Twenty-two natural environments of Australia described and depicted in color photographs. $6.95

O. S. Heavens
LASERS

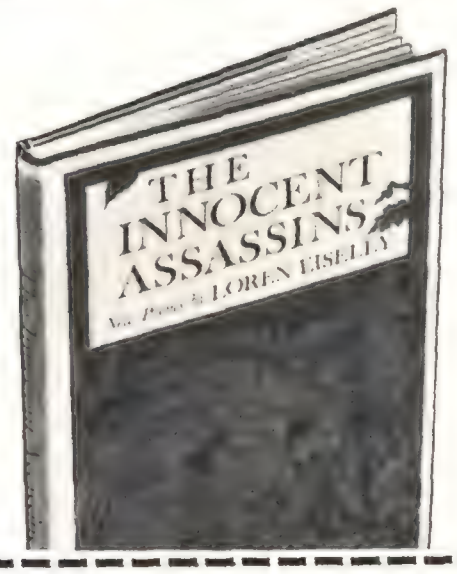
How lasers work, how they are likely to develop, what they can do, and what impact they are likely to have in the future. Illustrated. $9.95

George Laycock
AUTUMN OF THE EAGLE

The story of the American bald eagle, from 1782 to its present status as an endangered species. Illustrated. $6.95

Ivan Smith
THE DEATH OF A WOMBAT
Drawings by Clifton Pugh

Deeply moving, beautifully illustrated story of an Australian wombat caught in a forest fire.
Foreword by H.R.H. The Duke of Edinburgh. $5.95



Robin Hanbury-Tenison
A QUESTION OF SURVIVAL

How the culture of the pre-Columbian peoples of Brazil is being destroyed for the sake of progress. Illustrated. $9.95

T. D. Stewart
THE PEOPLE OF AMERICA

A distinguished physical anthropologist presents a perspective for understanding the complex congregation of peoples that now inhabits America.
Illustrated. $10.00, $3.95 paper

Arline Thomas
MOCKINGBIRD TRIO

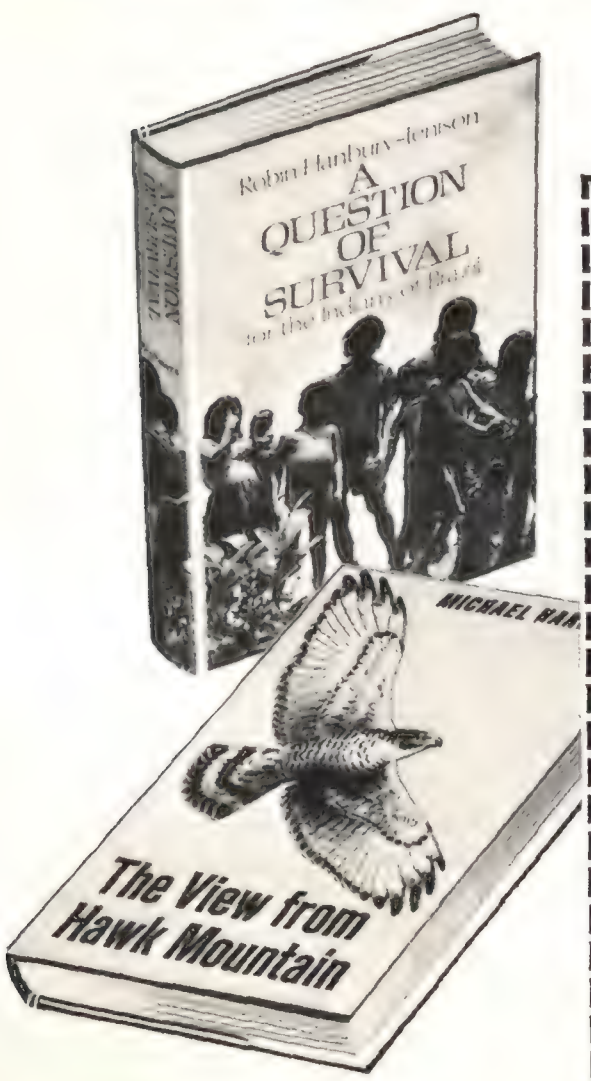
Truelife story of three wild mockingbirds who came to live with "the birdlady of Queens."
Illustrated. $5.95

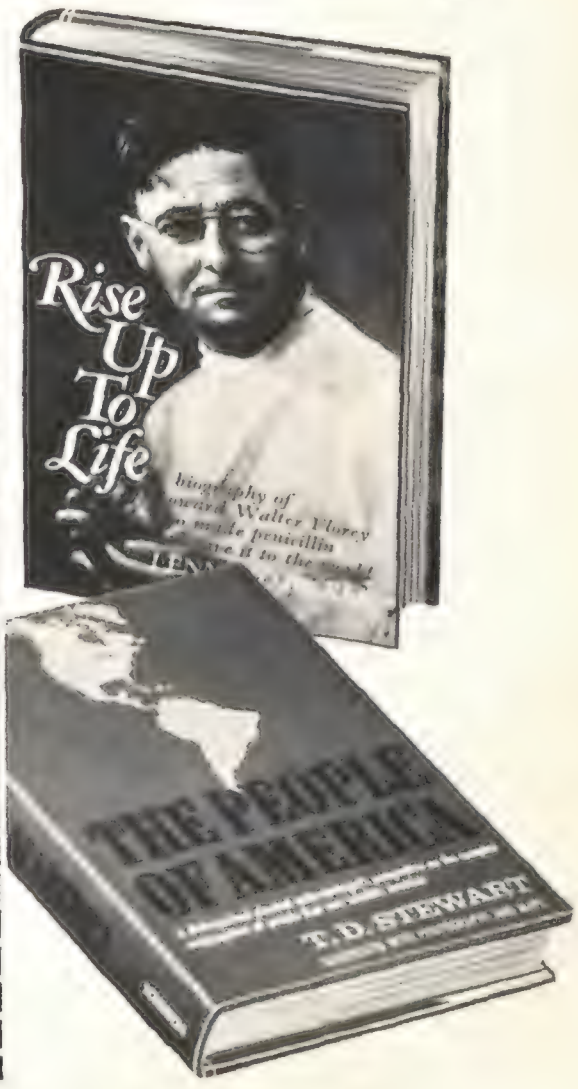
Michael Harwood
THE VIEW FROM HAWK MOUNTAIN

The story of the world-famous Hawk Mountain bird sanctuary in Pennsylvania and the conservation fight it has waged since 1934. $6.95

Aubrey Elliot
THE MAGIC WORLD OF THE XHOSA

A unique account of the rich life of a bantu tribe, profusely illustrated. $9.95





CHARLES SCRIBNER'S SONS
Dept: MS, 597 Fifth Avenue,
New York 10017

Please send me the books listed below:

_____

_____

_____

_____

_____

I am enclosing a check or money order, including sales tax plus 50¢ handling.

Name _____

Address _____

City _____

State _____ Zip _____

ANNOUNCING THE SMITHSONIAN COLLECTION OF CLASSIC JAZZ

The first time in the history of American music that such a compilation has been possible. Eighty-four original recordings from the archives of 17 record companies, in a single collection of 6 LPs. Accompanied by an authoritative 48 page booklet of jazz history, discography and photographs. This definitive collection contains recordings of Scott Joplin, Bessie Smith, Jelly Roll Morton, Louis Armstrong, Ella Fitzgerald, Billie Holiday, Sarah Vaughan, Duke Ellington, Thelonious Monk, Sonny Rollins, Modern Jazz Quartet, John Coltrane, Ornette Coleman and many more. The price of the set is $20. It is specially available to Smithsonian Associates for $18 (plus $1.50 to cover handling).

Please send me _____ copies of the Smithsonian Collection of Classic Jazz. Enclosed please find a check for $19.50 per copy.

Name (please print)

Street Address

City State Zip Code

Mail to: Classic Jazz, P.O. Box 14196, Washington, D. C. 20044.

The choicest French wines are chosen by the label.

B&G. Love letters from France.

36 fine wines in one fine family.

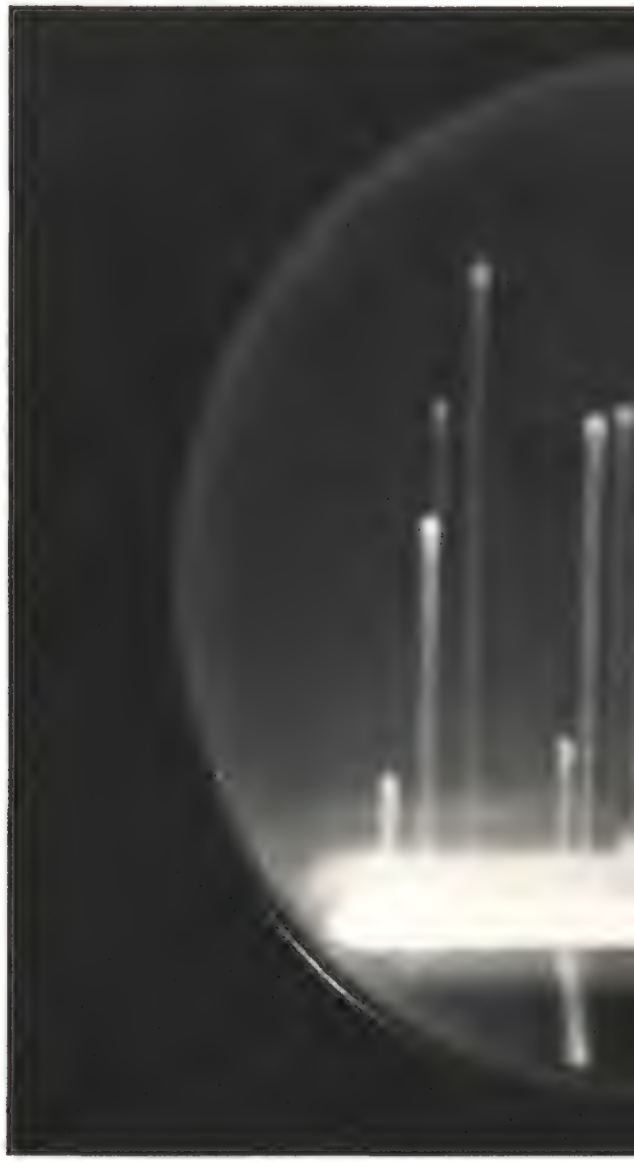
Imported by Browne Vintners Company, New York, N.Y. and San Francisco, CA.

the work of Otto Hahn or Lise Meitner:

"Some recent work by E. Fermi and L. Szilard, which has been communicated to me in manuscript, leads me to expect that the element uranium may be turned into a new and important source of energy in the immediate future. Certain aspects of the situation which has arisen seem to call for watchfulness and, if necessary, quick action on the part of the Administration. . . .

"In the course of the last four months it has been made probable—through the work of Joliot in France as well as Fermi and Szilard in America—that it may become possible to set up a nuclear chain reaction in a large mass of uranium, by which vast amounts of power and large quantities of new radium-like elements would be generated. Now it appears almost certain that this could be achieved in the immediate future.

"This new phenomenon would also lead to the construction of bombs, and



Among the lay world's first glimpses of man-made fission, this 1939 photograph was taken by Fritz Goro in the Columbia University laboratory of Enrico Fermi

it is conceivable—though much less certain—that extremely powerful bombs of a new type may thus be constructed. A single bomb of this type, carried by boat and exploded in a port, might very well destroy the whole port together with some of the surrounding territory. . . .

"In view of this situation you may think it desirable to have some permanent contact maintained between the Administration and the group of physicists working on chain reactions in America. . . .

"I understand that Germany has actually stopped the sale of uranium from the Czechoslovakian mines which she has taken over. That she should have taken such early action might perhaps be understood on the ground that the son of the German Under-Secretary of State, von Weizsäcker, is attached to the Kaiser-Wilhelm-Institut in Berlin where some of the American work on uranium is now being repeated."

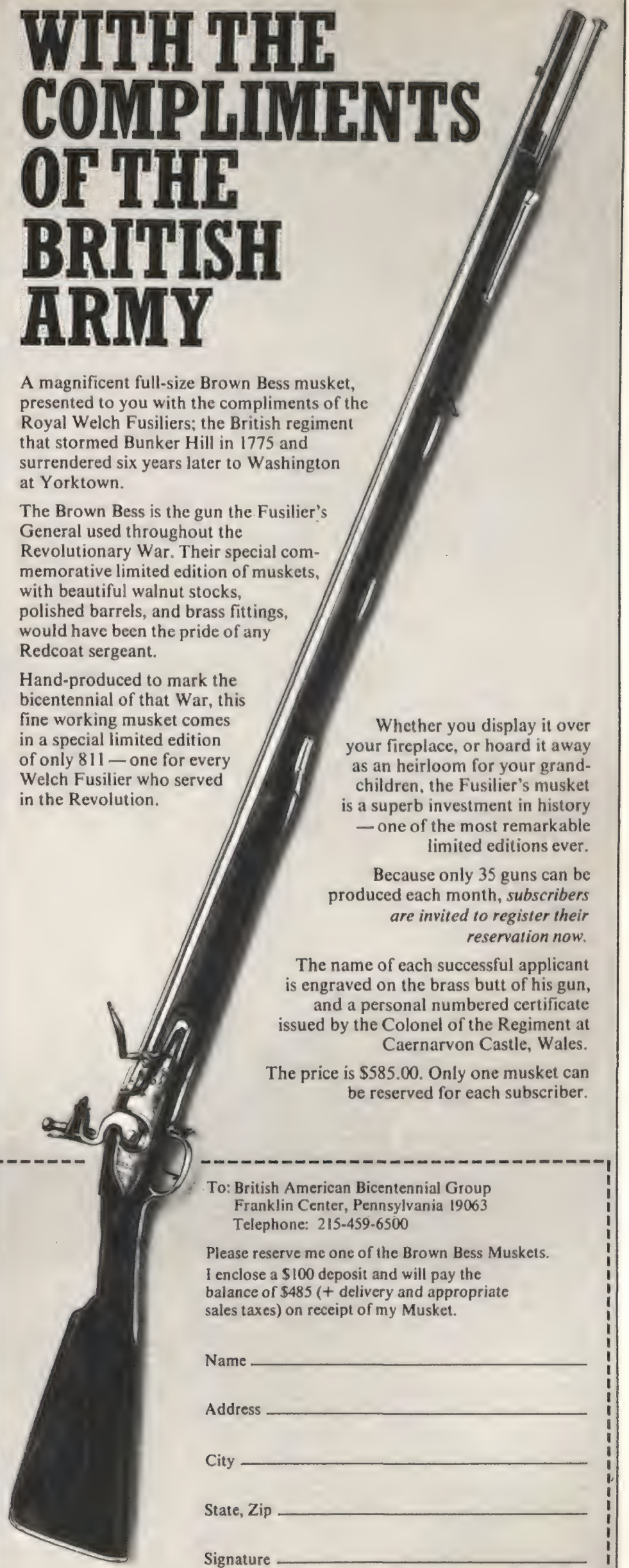
during an early experiment on fission. Peaks on oscilloscope show the bursts of energy from the splitting of uranium nuclei bombarded with neutrons.

WITH THE COMPLIMENTS OF THE BRITISH ARMY

A magnificent full-size Brown Bess musket, presented to you with the compliments of the Royal Welch Fusiliers; the British regiment that stormed Bunker Hill in 1775 and surrendered six years later to Washington at Yorktown.

The Brown Bess is the gun the Fusilier's General used throughout the Revolutionary War. Their special commemorative limited edition of muskets, with beautiful walnut stocks, polished barrels, and brass fittings, would have been the pride of any Redcoat sergeant.

Hand-produced to mark the bicentennial of that War, this fine working musket comes in a special limited edition of only 811 — one for every Welch Fusilier who served in the Revolution.



Whether you display it over your fireplace, or hoard it away as an heirloom for your grandchildren, the Fusilier's musket is a superb investment in history — one of the most remarkable limited editions ever.

Because only 35 guns can be produced each month, *subscribers are invited to register their reservation now.*

The name of each successful applicant is engraved on the brass butt of his gun, and a personal numbered certificate issued by the Colonel of the Regiment at Caernarvon Castle, Wales.

The price is $585.00. Only one musket can be reserved for each subscriber.

To: British American Bicentennial Group
Franklin Center, Pennsylvania 19063
Telephone: 215-459-6500

Please reserve me one of the Brown Bess Muskets.
I enclose a $100 deposit and will pay the balance of $485 (+ delivery and appropriate sales taxes) on receipt of my Musket.

Name _____

Address _____

City _____

State, Zip _____

Signature _____

E-7

a magnificent obsession

It had been his father's hunting lodge isolated in a marsh far from Paris . . . but for Louis XIV it soon became a magnificent obsession called Versailles —a grand palace for his elegant whims . . . where leopards and lions would roam in courtyards below as hundreds of guests dined at silver tables in week-long banquets and celebration . . . where he, the Sun King of France, reigned supremely from his world of mirrors and chandeliers, from his acres of gardens stocked with hummingbirds and flamingoes to the affairs of state and the affairs of passion.

Versailles—the life-long creation of Louis XIV, who at the age of 30 was Europe's most formidable ruler—is the story of France in her most opulent era . . . of court intrigue where rival mistresses used poison as well as passion to gain favor . . . of the famous and powerful Madame de Pompadour and the haughty, lovely Marie Antoinette . . . of revolution and artistry, decadence and decorum. Travel to Versailles and walk the coldly beautiful Hall of Mirrors . . . stand at the window where Napoleon dreamed of future glories in an echoing, empty palace . . . promenade through a vast and incredible city of gardens.

(Actual size: 9¼" x 11½")

Go there, visit Versailles as our guest by discovering VERSAILLES—a unique and lavishly illustrated volume that's part of an exciting, new series from Newsweek Books called Wonders of Man. You can sample this volume—and the series—without obligating yourself to buy anything. The order card (or the coupon) will bring you VERSAILLES to examine in your own home for 10 days.

Picture credits: Adam Woolfitt; Versailles (Musées Nationaux) and Louvre.

A series called Wonders of Man

VERSAILLES is just one of the volumes in Newsweek's Wonders of Man series. Each book in the series uses a particular monument as a focal point and examines the important aspects of a nation's history, culture, government and entire civilization. Each volume is 9¼" x 11½" and has 176 pages. Each lucid text is combined with art and literature in an attractive, interesting-to-read package that includes:

- a 40,000-word narrative history—lively and lucid—written by a world-renowned historian and richly illustrated in color and black and white. There are about 100 illustrations in each volume—more than half in full color.
- a section on literature—with excerpts from writings about the monument. Also included in this section is a chronology of the monument and the civilizations with which it is associated plus a guide to other monuments in the city or country, a supplementary reading list, and an index.

From VERSAILLES to THE COLOSSEUM, from the STATUE OF LIBERTY to THE PYRAMIDS AND SPHINX, from NOTRE DAME De PARIS to THE KREMLIN—you'll enjoy a chronological sweep of history from ancient Egypt and the Roman Empire to 19th-century America.

FREE GIFT! **A beautiful addition to the Wonders of Man tour through history.**

Musical England

A special selection of melodies to delight the ear

A musical tour that gives you the feeling of Merrie Olde England. A collection of aires, ballads, folk tunes and classical music chosen to please the ear. This special 12" stereo record contains selections performed by such artists as organist E. Power Biggs and guitarist John Williams, and melodies sung by the Norman Luboff Choir and Joel Grey.

This one-of-a-kind record is yours—FREE, no cost, no obligation—for agreeing to simply examine VERSAILLES!

Please note: Additional copies of MUSICAL ENGLAND are available, on request, at $5.95 per copy, plus a small charge for postage and handling.

Yours FREE for 10 Days

Don't miss this no-risk opportunity to begin your collection of these distinctive volumes in such a convenient and inexpensive way. Our plan, you'll find, is indeed simple:

1. The reply form will bring your copy of VERSAILLES (176 pages; 9¼" x 11½" overall) to examine at your leisure for 10 days—without any cost or obligation.
2. If you're not thoroughly delighted with VERSAILLES, return it in 10 days—and owe nothing.
3. On the other hand, should you decide to keep VERSAILLES, just send $6.95 (plus the small postage and handling charge). You will then receive future volumes of Wonders of Man at regular two-month intervals—every one as lavish and dynamic as the first. Every volume with about 100 illustrations—half of them in color.
4. Each volume will be offered on the same 10-day free-examination basis—at the same low price of only $6.95, plus postage and handling.
5. At no time are you under any obligation to buy. You accept as few or as many books as you wish—there's no minimum. Build your library at your own pace, according to your own preferences. And you're free to cancel whenever you decide.

Deluxe Edition Available

You may prefer VERSAILLES and future volumes in the Deluxe Edition. The fine-grain binding is designed to outlast and outshine ordinary leather. Handsome gold-tooling on the spine and a full-color laminated dust jacket add extra luxury. These volumes have the elegance of fine books costing a good deal more. Yet your cost is only $2 additional per book. Just check the appropriate box on the reply form.

Send for your copy of Versailles today!

No need to send money now. No obligation ever!

To: **Newsweek Books/ WONDERS OF MAN** CWX153
The Newsweek Building, Box 408, Livingston, N.J. 07039

Please send me **VERSAILLES** to examine **FREE for 10 Days** and enter my trial subscription to Wonders of Man. If, after examining this book, I do not choose to keep it, I may return it within 10 days and I will be under no obligation. If I keep **VERSAILLES,** I will pay only $6.95 plus shipping and handling. You may then send me future volumes in the series, shipped a volume at a time at two month intervals at the same price of $6.95 plus shipping and handling.

Each book is to be sent to me on approval. I may return any book in this series within 10 days after receiving it, and I can cancel my subscription at any time simply by notifying you.

My initials:.....

☐ I would prefer having **VERSAILLES**—and any future volumes I may take—in the Deluxe Edition at only $2 more per book.

Include my FREE GIFT (mine to keep whatever I decide about the book!)

Mr.
Mrs.
Miss (please print)

Address

City State Zip

NOTE: Available only in U.S. and Canada.
Residents of Canada: Add $1.00 more per volume.

Lincoln's Secretary of the Navy, Gideon Welles, left copious diaries that have made important contributions to our understanding of the Civil War and Reconstruction eras. Now this comprehensive biography increases our understanding of the complex, energetic man who served as journalist, statesman, Presidential advisor, and decision-maker in the most crucial period of America's history. "A first-rate biography and a notable contribution to political and Civil War history. The story is told with great skill and holds the reader's interest."—T. Harry Williams, Louisiana State University. "A valuable addition to the growing number of reconsiderations of important Civil War and Reconstruction men and measures...This new *Welles* is welcome indeed!"—Harold Hyman, Rice University.

GIDEON WELLES

by John Niven

Illustrated, $17.50

OXFORD UNIVERSITY PRESS

200 Madison Ave., N.Y., N. Y. 10016

Book reviews

The Art of Walt Disney
Christopher Finch
(Abrams, $35 through Dec. 31; then $45)

Implicit in the title and, to some extent, the size of this 458-page seven-pounder on the career and works of Walt Disney is the assumption that what he did was indeed art—and art with no qualifying word like "popular" preceding it. So foregone is the conclusion that author Finch doesn't even discuss it; he simply compares Disney to Picasso and Chaplin without a second thought.

By the time one is finished with this enormous and attractive volume, one is prepared to admit that the question is moot. Whatever it was Disney did, it has had a profound and probably incomparable effect on the fantasy life of the world—especially in the United States, where Mickey Mouse was born and where nearly 28,000 acres of land are given over to the two "magic kingdoms" Disney conceived—Disneyland in Anaheim, California, and Walt Disney World near Orlando, Florida.

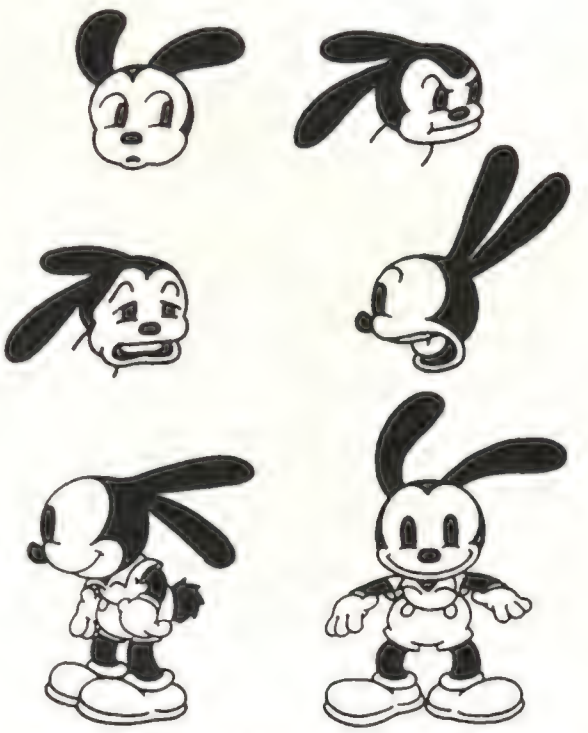
Born in Chicago, Disney spent half his childhood on a farm in Marceline, Missouri, before moving to Kansas City. Occasionally he was beaten by his father, who would not allow Walter Elias to go to the movies—though Disney did sneak out and see films anyway. One of them was a silent version of *Snow White and the Seven Dwarfs,* later the subject of his first animated feature.

Success came slowly. Not until the 1950s was Walt Disney Productions the wildly profitable thing it is today. There were many setbacks at the beginning. Disney's first major cartoon character, Oswald the Lucky Rabbit, was virtually kidnapped by a rival company. Disney was heavily in hock when *Snow White* was finally released and in debt again 20 years later when he began to build Disneyland. There were small problems, too, such as the Hays office's insistence that Disney's cows be utterly udderless.

Finch gives us little insight into the man behind the mouse in the rather bland text that accompanies the book's 763 illustrations, many of them in color. In almost apologetic tones, Finch defends both the total output and the basic decency of the cartoonist-businessman who never lost control of his far-flung projects until the day he died in 1966.

But this fat book just isn't the place for intensive—or even objective—analysis. *The Art of Walt Disney* was produced with the full cooperation of (and copyrighted by) Walt Disney Productions.

Though certainly numerous, the illustrations are not always exactly what the



Oswald the Lucky Rabbit—his kidnapping brought about birth of Mickey Mouse.

reader might want to see. The animation process is explained in the text but not in the pictures. Some of the foldout pages seem wasted; one gives a huge view of a dull potato. Another page is given over to scenes of actor Terry-Thomas recording a voice track for the new Disney feature *Robin Hood,* which gets a chapter-long plug all to itself.

The book closes with an essay by Peter Blake praising the two Disney amusement parks as "the only truly interesting

New York Graphic Society

IDEAL CHRISTMAS GIFTS

THE BARN: A Calendar for 1974

Photographs by Dudley Witney. A magnificent calendar incorporating the finest work from *The Barn* plus striking new shots. 27 color photographs. 14 x 12 ins. Boxed, $4.95

IN THIS PROUD LAND

America 1935-43 as Seen in the Farm Security Administration Photographs

By Roy Emerson Stryker and Nancy Wood. A wonderful portrait of rural America by some of the nation's best photographers. 200 b & w ills. 192 pp. 9 x 12 ins. $15.00

EYELIDS OF MORNING

The Mingled Destinies of Crocodiles and Men

By Alistair Graham. Photographs by Peter Beard. A stunningly illustrated, searching examination of civilization's impact upon primitive man and prehistoric beast. 16 color, 400 b & w ills. 260 pp. 9 x 12 ins.
$17.50 until 1/31/74. ($22.50 thereafter)

THE PIECED QUILT

An American Design Tradition

By Jonathan Holstein. A brilliant study of a unique American folk art by "the most looked-to scholar in the field."—*New York* magazine. 96 color plates, 59 b & w ills. 192 pp. 9 x 12 ins. $17.50

VICTOR VASARELY

Planetary Folklore

By Victor Vasarely. In this witty, visually exciting book, the inventor of Op art reveals the full range of his creative imagination. 88 pp. of b & w and color ills. 88 pp. 9¼ x 9¾ ins. $15.00

THE INVISIBLE MADE VISIBLE

The Expansion of Man's Vision of the Universe Through Technology

By Ernst von Khuon. Pictures of unexpected and astonishing beauty: microphotographs, time-lapse and other new techniques reveal the formerly unseen. 39 color plates, 236 b & w ills. 300 pp. 10 x 11½ ins. $19.95

LOOKING AT PHOTOGRAPHS

One Hundred Pictures from the Collection of the Museum of Modern Art

By John Szarkowski. "A book of breathtaking beauty—a connoisseur's anthology of superlative photographic accomplishment . . . promises to become a classic in its field."—*N.Y. Times.* 100 b & w ills. 215 pp. 9 x 12 ins. The Museum of Modern Art. $15.00

THE HISTORY OF IMPRESSIONISM

By John Rewald. The classic in the field, out of print since 1967, now available in a new, expanded, updated edition. 82 color plates, 541 b & w ills. 672 pp. 9 x 10 ins. The Museum of Modern Art. $27.50

AT ALL BOOKSTORES

NEW YORK GRAPHIC SOCIETY 140 Greenwich Avenue, Greenwich, Conn. 06830. A Time Incorporated Company

Round The World
CRUISE
4 months for as low as $3,105 First Class

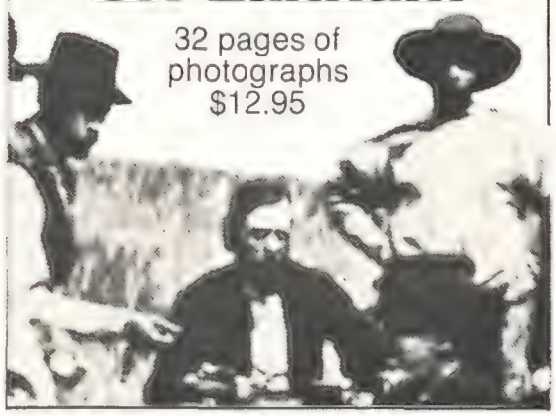
- Beautifully appointed, all-air-conditioned 210- to 350-passenger cargo liners to Acapulco, Panama Canal, Port Everglades, Rio de Janeiro, Santos, Buenos Aires, Capetown, Durban, Lourenco Marques, Singapore, Hong Kong, Kaohsiung, Keelung, Kobe, Yokohama, Vancouver, B.C., San Francisco, Los Angeles. Monthly sailings.
- Up to 40 days in port gives you time for lengthy shore excursions.
- All accommodations are first class with private bath or shower.
- Swimming pool, spacious lounges, Continental and Chinese cuisine, full range of shipboard activities.
- **No Age Limit.** Doctor and nurse on board.
- The M.V. Oriental Esmeralda and M.V. Oriental Carnaval are registered in Liberia. The M.V. Oriental Rio is registered in Taiwan.

See your travel agent or contact
ORIENT OVERSEAS LINE
THE LEISURE LINE

General Passenger Agents:
Orient Overseas Services, Inc.
311 California St., San Francisco, California 94104
Please send me more information on your Round-The-World cruises.
Name_____
Address_____
City_____
State_____ Zip_____
SM

In pursuit of the Titanothere, the Allosaurus, and the Eohippus, they braved the wrath of hostile Indians, rattlesnakes, and six-gun toting bandits. The bone hunters' race for the rich fossil finds of the Great West was as dramatic as any land rush or cattle stampede, and Url Lanham, Curator in the Museum of the University of Colorado, tells the tale with a connoisseur's appreciation of its color, excitement, and scientific importance.

THE BONE HUNTERS
Url Lanham
32 pages of photographs
$12.95



COLUMBIA UNIVERSITY PRESS
New York, New York 10025

FOR GREATER RELAXATION, CONCENTRATION,
... listen to your Alpha and Theta brainwaves!

Do it with an amazing biofeedback monitor. This ultra-sensitive sensor detects brain signals, lets you monitor (hear and **see!**) your Alpha and Theta brainwaves. Great aid to relaxation, concentration. This portable (8 x 3 x 4") lightweight (24 oz.) metal unit has a unique electrode headband to slip on or off in seconds without messy creams or solutions. Hooked to amplifier, it filters brainwaves, and signals an audible beep for each Alpha or Theta wave passed. You get both audio and visual (L.E.D.) feedback with this reliable, completely safe unit. It operates on two 9v transistor batteries, offers features comparable to many costlier models. A comprehensive instruction booklet is included.

Order No. 1635KS JUST $124.50 Ppd.
NO. 71,809KS (LOW COST "STARTER" UNIT)..$49.95 Ppd.

YOU MUST BE DELIGHTED!
EVERYTHING EDMUND SELLS HAS A 30-DAY MONEY-BACK GUARANTEE. Return it if you aren't delighted.

GIANT FREE CATALOG!
NEW! 164 PAGES—OVER 4500 UNUSUAL BARGAINS FOR HOBBYISTS, SCHOOLS, INDUSTRY . . . JUST CHECK COUPON!

EDMUND SCIENTIFIC CO.
300 Edscorp Bldg., Barrington, N.J. 08007
America's Greatest Science • Optics • Hobby Mart
Helping to develop America's Technology for over 30 years.

COMPLETE AND MAIL COUPON NOW

EDMUND SCIENTIFIC CO.
300 Edscorp Bldg., Barrington, N.J. 08007
Send me: ____Biofeedback Trainer(s)
No. 1635KS ea. @ $124.50 Handling ea. .50
No. 71809KS ea. @ $49.95 Handling ea. .50
Encl is ☐ check ☐ M.O. in amount of $_____
( ) Send FREE 164-Page catalog "KS"
Name_____
Address_____
City_____
State_____ Zip_____

New Towns constructed in the United States since World War II." Disney himself is hailed as a practical visionary with bold and sensible urban ideas.

That is not the Disney the world fancifully cherishes, however. Whatever his faults or virtues as a master builder and businessman, it is Disney's animated cartoons and their often memorable characters that have a hold on our collective imagination. *The Art of Walt Disney,* in some respects disappointing, does help explain and illustrate the pervasive charm of Disney's best work.

A theater full of kids and adults laughing and cheering the big-eared mouse with the accommodating grin will, however, continue to say it a lot better.
—*Tom Shales*
Cultural reporter for the *Washington Post,* film critic for National Public Radio

The Plundered Past
Karl E. Meyer
(Atheneum, $10)

This is an excellent book on the sometimes grubby and sometimes glamorous international market in art and archaeology. Mr. Meyer gives an absorbing account of the high prices paid for art objects (which are of dubious origin in many instances), the large-scale art thievery, the destruction of irreplaceable archaeological sites and other aspects of the trade. His special concern is what is happening to the archaeological record of Man's past, threatened by greed and indifference. And he provides a valuable appendix of data on stolen art works, a full bibliography and a table of national protective laws.

"More than any other single element," he writes, "the increase in art prices has been responsible for the wholesale theft, mutilation, and destruction of art everywhere in the world." A few well-funded museums and big private collectors account for the acquisitions at spectacular prices, while a growing number of collectors of relatively modest means help to drive up prices of small objects. High prices encourage an illicit trade that has become a major economic activity in some countries, providing income to tomb-robbers, statue-snatchers, ill-paid and bribable guards and customs officials.

The author is not only a good storyteller; clearly, he also has a sense of mis-

Now for some good news about the energy crisis

The typical two-car, air-conditioned, plugged-in American rides high on a cresting wave of energy. Statistics show we have doubled our energy consumption every 10 to 15 years since the turn of the century.

Now, brownouts, blackouts, empty gasoline pumps, industry pronouncements and Presidential warnings all tell us this trend cannot continue: an "energy crisis" is about to pull the plug on the American Dream.

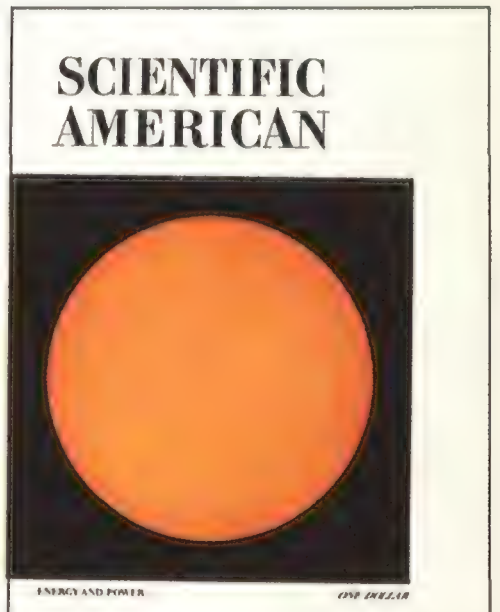
The good news? It doesn't have to happen. Advances in science and technology, reported over the past 25 years in the pages of SCIENTIFIC AMERICAN, offer us an inexhaustible supply of all the energy we can find the wisdom to use.

A few of the more promising advances include: the breeder reactor, which brings into reach resources exceeding the earth's entire supply of fossil fuels; liquefaction and gasification of coal; oil from shales; superconductive transmission, and solar power.

No, the "crisis" is not one of resources or technology. It is one of international politics and trade, of domestic economics. It involves the public safety and the hazards of new technologies, and it engages man's ability to accommodate his numbers and his appetites to the bounty of the earth's environment. To all of these questions science and technology bring understanding and workable solutions. So they too have been explored on a continuing basis in the pages of SCIENTIFIC AMERICAN.

The magazine's authors are the scientists who did the work reported. In collaboration with the magazine's editors they present their discoveries lucidly, accurately and readably for the comprehension of the interested and concerned layman.

Pick any major subject area from medical research to race relations, and you are likely to find a whole string of SCIENTIFIC AMERICAN articles running back a score of years or more—providing clear, meticulously documented, often prophetic analyses of problems and weighing practical alternatives.



Scientific American makes sense today out of issues that will make headlines tomorrow.

SCIENTIFIC AMERICAN, Dept. 12J
415 Madison Avenue
New York, N.Y. 10017

Please enter my subscription to SCIENTIFIC AMERICAN for one year for only $10. (A saving of $2 off the newsstand price.)

SPECIAL INTRODUCTORY BONUS: Use this coupon and you will receive as a free gift our big 250-page issue on "Energy and Power." This special issue is yours without charge, in addition to your 12 regular issues.

☐ Check enclosed. ☐ Bill me later.
($12.50 outside U.S. and Canada.)

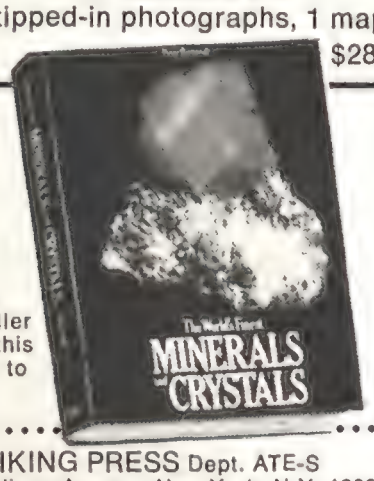
Name

Address

City State Zip

The World's Finest MINERALS and CRYSTALS by Peter Bancroft

Glorious mineral and crystal specimens (among them, rare museum pieces) share the pages with facts about minerals and collecting.
A STUDIO BOOK
72 tipped-in photographs, 1 map
$28.50



At your bookseller or use this coupon to order:

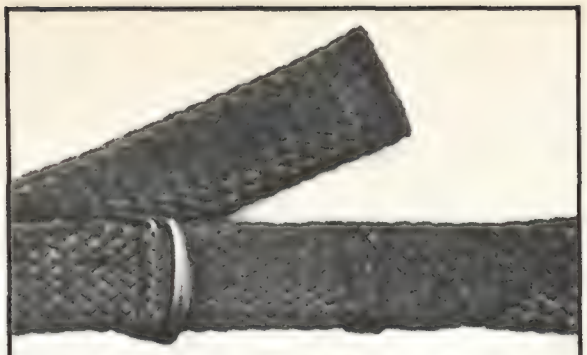
THE VIKING PRESS Dept. ATE-S
625 Madison Avenue, New York, N.Y. 10022

Please send me_____copies of *The World's Finest Minerals and Crystals* @ $28.50 ea. I enclose ☐ check ☐ money order for $_____total. (If not completely satisfied, return the book within 10 days for a full refund. Please add sales tax where applicable.)

Name_____

Address_____

City_____ State_____ Zip_____



BRAIDED CALFSKIN BELTS
These pliant comfortable belts are hand braided from sixteen strands of specially tanned calfskin. The width is one and one-half inches, the color natural tan. The distinctive dees in the closure are sand cast brass.
No. 817C 1½ inch $12.50 ppd
Please state waist size
Satisfaction Guaranteed. Order Now.
Send for our unique catalog
AUSTRAL ENTERPRISES
P.O. BOX 70190 SEATTLE, WA 98107

ESTATE BOTTLED
VINTAGE
VARIETAL RED
AND WHITE WINES

BULLY HILL VINEYARDS
WALTER S. TAYLOR, OWNER
HAMMONDSPORT, N.Y. 14840
"WINE WITHOUT WATER"
Send for free brochure, Dept. SM

Authentic Potter's Wheel

Create your own ceramics with this remarkably-priced modern version of a complete colonial potter's workshop. Seat and flywheel adjust for adults or teenagers. Comes with double-end shaping tools, non-toxic glaze and 4 water-soluble paints, artist's brush, potter's sponge, 3 lbs. air-dry clay and illustrated instructions for forming vases, pitchers, candlesticks plus design ideas to stimulate the creative genius in you and your kids. No baking or firing required. Send check or money order to Kristi's, Inc., P.O. Box 357s, Maugansville, Md. 21767.

$55 ppd in continental U.S.

POTTERYCRAFT™ by GILBERT®

sion to do something about the plunder. Are there possible ways of saving what remains of Mayan temples, Etruscan tombs (SMITHSONIAN, October 1970 and March 1972), American Indian mounds and their counterparts around the world? Many skeptics think probably not; those lusting to collect, backed by money—usually Americans, Europeans or Japanese—will find ways to evade controls. Mr. Meyer is more hopeful, however, and notes some recent proposals to police the trade.

U.S. museums could help by following the lead of a few university museums—and the Smithsonian Institution—in barring acquisition of objects of uncertain pedigree. Disclosure of prices and sources (traditionally withheld by museums) might discourage questionable deals.

The U.S.-Mexico treaty of 1971 could be used as a model for other countries: Each has agreed to recover and restore cultural objects, found within its borders, that have been stolen from the other since the date of the agreement. UNESCO has drawn up a treaty by which the parties promise to bar imports of "cultural property" stolen from others, and to take cooperative action when a nation's "cultural patrimony is in jeopardy from pillage." So far only 16 nations have fully acceded to this treaty; formal U.S. ratification and enforcement are still awaited.

U.S. action, although important, cannot regulate the international traffic by itself. There are other big acquisitors. Moreover, some of the nations that shout loudest about depredation of their "national patrimony" practically assure a lively black market by indiscriminately barring the export of objects within their borders. Sensible export policies in the archaeologically rich nations are as essential as regulation of imports by the have-nots (it is usually not illegal in the United States to *buy* objects that are illegally exported from the countries of origin). No matter what laws are passed or treaties made, the cost is depressingly high for policing of sites, prevention of decay, controlled digging and recording, and other measures of preservation.

One ingredient of corrective action is publicity and information. Mr. Meyer's book is a landmark in the process of public education.

—H. C. L. Merillat
Author of *Sculpture West and East*
and former executive director of the
American Society of International Law

Livingstone
Tim Jeal
(Putnam, $10)

The popular British conception of David Livingstone is, Tim Jeal believes, that of an "old and saintly man wandering meekly through the wilds of central Africa . . . pursuing an almost mystical quest, in which the search for the Nile's source is somehow merged with the nobler . . . objective of ending the slave trade with prayer and gentle persuasion." If so, the prevailing memory of him on this side of the Atlantic is doubtless as the receiver of a classic among fatuous remarks.

To students of African exploration, of course, the famous missionary certainly has had little reputation for saintliness, and the absurdity uttered by journalist Henry Morton Stanley on finding him in Ujiji in November 1871, when Livingstone hadn't heard the voice of a white man for six years, had been much better left unsaid. (Stanley agreed, by the way.) "Dr. Livingstone, I presume" became a threadbare jest that pained him throughout the rest of his life.

With access to recently uncovered primary material, and without the self-locked shackles of earlier biographers (clergymen all, with a vested interest in hagiology), Jeal meticulously draws a portrait in which saintliness dissolves, the jokes fall away and Livingstone stands revealed as a man so idiosyncratic as to be nearly incredible:

Self-righteous to his toenails; self-contradictory; heartless; monstrous to his wife and children; driven to superhuman efforts both by his background and by the God whose tool he believed himself to be; often untruthful; utterly lacking in empathy toward most white people, yet thoughtful with Africans; a roiling mass of self-justification intent on bringing the benefits of Christianity and capitalism to Africans whom he knew to be degraded by such European contacts as they already had. And with it all, a determination to surpass other men's journeys and achievements so all-devouring as to become almost a monomania.

We can easily tick off Livingstone's failures: He failed as a missionary (his one convert backslid); he failed as a patron of other men's missions; he failed as husband and father. After triumphs as an explorer (he was the first white man to travel coast-to-coast in southern Africa

Living Gifts from Bear Creek Gardens®

Friends, neighbors, relatives, business associates (that's darn near everybody!) — none of 'em could resist these healthy, carefree, beautiful plants. So easy to grow — and you know how they'll delight winter-bound city friends and office workers — apartment dwellers, convalescents, folks with little time to garden — everybody likes a gift of green, growing natural beauty. All GUARANTEED TO GROW AND THRIVE!

Christmas Crocus

Ready to get growing — 12 top size pre-started Holland bulbs, pre-planted in a genuine Delft Ware planter. They'll have brilliant purple posies for 3 to 4 weeks. Reusable Delft planter is handmade and handpainted in Holland. Order now for arrival after Dec. 10.

Order Gift No. 801 . . . $8.95 delivered

Available for delivery to the connecting 48 states.

Giant African Amaryllis

Just add water and stand back! Completely pre-planted, exotic Amaryllis grows nearly an inch a day — indoors! Bursts out with 3 to 5 flaming red 8-inch blooms in 4 to 6 weeks, just in time for Christmas! Big, vigorous bulb will bloom year after year . . . a reminder of you each season.

Order Gift No. 806 . . . $5.95 delivered

Available for delivery to the connecting 48 states, Alaska, and Hawaii.

Bonsai Juniper and Handbook

Nature in miniature — this little tree is already three years old, yet just 6 inches high. Harry and I send this tiny juniper planted in a clay pot; comes with an authoritative 96-page handbook exploring the fascinating history of the ancient and subtle art of Bonsai.

Order Gift No. 261 . . . $12.95 delivered

Available for delivery to the connecting 48 states.

EASY TO ORDER

Just send us your list. Enclose check or money order (no COD's please). Tell us how to sign your greetings for each gift. All prices include delivery. ORDER NOW FOR CHRISTMAS DELIVERY.

PERFECT DELIVERY GUARANTEED

Send your orders to:

Harry and David®
Bear Creek Gardens
Box 525-G Medford, Oregon 97501
CREATORS OF THE FRUIT-OF-THE-MONTH® CLUB

© 1973, Harry and David

10½" H x 10" W $ 1875.

Cybis Eskimo Mother...

A gentle expression of love, Eskimo Mother an issue of 350, from the Portraits in Porcelain Collection by Cybis.

CYBIS Porcelain Enchantments.

Available now at Everhart Jewelers. Inquiries Invited.

Everhart Jewelers

Members, American Gem Society

FAIRFAX, VIRGINIA
9966 MAIN STREET
(703) 273 - 2550

McLEAN, VIRGINIA
6649 OLD DOMINION DRIVE
(703) 821 - 3344

EAST AFRICA WILDLIFE

COMPREHENSIVE in-depth viewing of abundant, various wildlife concentrations in famous National Parks and Reserves of Kenya and Tanzania: Nairobi, Treetops, Mt. Kenya, Tsavo, Amboseli, Mt. Kilimanjaro, Arusha and Ngurdoto Crater, Lake Manyara, Ngorongoro Crater, the Serengeti, and Masai Mara. *East Africa Wildlife Society* briefing and membership. Finest hotels and lodges. Only 5 guests to each Microbus. Everyone has a window seat. Leisurely pace. Small party. Tribal life, Masai and Chuka dances. *Only $1519* plus air fare. All land services, tipping, Park fees included. Expert escort.

PRIVATE AIR SAFARI flight-seeing for spectacular views and ease of travel. Everyone has a window seat!

ALSO four other Africa tour programs from 22 days to a Grand 49 days, from $1383 to $3521 plus air fare.

ASK your Travel Agent for Maupintour's new 36-page Africa tour book or write to:

MAUPINTOUR
270 Park Ave., New York, New York 10017
Please send new 36-page Africa tour book.

name _____

address _____

city _____

state/zip _____

WILD RIVERS

IDAHO

Raft America's Deepest Gorges!

Hells Canyon of the Snake, Salmon River ("River of No Return"), and Middle Fork • First offering of the Owyhee, a river few have seen • Combination Salmon River float and high country horseback trips • Salmon River "U-Row", using newly designed rubber kayaks, with support raft leading the way • Special interest nature, wild life camera safaris • Early booking essential. Request color brochure with details, dates and rates.

Wilderness Encounters, Inc.
Jim Campbell, President
P. O. Box 232, Dept. S123
Cambridge, Idaho 83610
Phone 208/257-3410

and he made important contributions to the exploration of the Zambezi River) he failed in his supreme goal. Reaching the source of the Nile was for Livingstone the equivalent of the North Pole for Peary or the moon landing for the astronauts. Livingstone was certain he had concluded the search, but his Nile source turned out to be the upper Congo.

After his death, and in part because of his seeming martyrdom, most of the remaining slave trade was indeed cut off, British colonization of Africa did come and the benefits of Christianity and capitalism, such as they were, were visited upon the tribesmen—with what final results we have yet to learn.

Jeal's rich telling of this tale, warts, ulcers, tumors, malaria and all, seems certain to be the standard biography of both man and myth; it is hard to imagine why anyone need write this story again.

—Frank Sartwell
Free-lance writer and occasional contributor to SMITHSONIAN

Return to Earth
Colonel Edwin E. (Buzz) Aldrin jr., with Wayne Warga
(Random House, $7.95)

When Buzz Aldrin, aged 33, Air Force pilot, number-three man in the West Point Class of 1951, Doctor of Science from M.I.T., was examined for the third astronaut group in 1963, the psychiatrist adjudged him "rock solid in the head." (The ambiguity of the phrase obviously escapes Aldrin.)

Eight years later, Aldrin has resigned from the space program and has again donned his sky-blue uniform, this time as commander of the Aerospace School at Edwards Air Force Base in California. He is despondent, filled with "self-doubt and self-hate," incapable "of controlling anything." He is deep into an affair with a New York divorcée, which leaves him (a Presbyterian elder) feeling guilty but unrepentant.

So, the ex-astronaut decides to seek help. The doctor he is referred to, now a civilian practicing in Los Angeles, turns out to be his original psychiatric examiner. "In my condition I made him look bad," Aldrin writes.

During the intervening years, the author of this excruciating book made history. As an astronaut Buzz Aldrin was

In 3 seconds you'll know which electric portable to give this Christmas.

Smith-Corona's new Cartridge Ribbon Typewriter.

It's the only one with the 3-second ribbon change.

Which is the quickest, simplest typewriter ribbon change there is. Also, the cleanest.

What's more, Coronamatic™ Ribbon Cartridges come in nylon and carbon film (the kind usually available only with expensive office typewriters).

So in the same 3 seconds it takes to change a cartridge, you can now change to carbon film for typing that looks like printing.

It's like having two typewriters in one. One for day-to-day use. The other for more professional-looking correspondence or reports.

And in case you make a mistake, there's a correction ribbon in a Coronamatic cartridge, so you can correct errors in seconds.

There's also an assortment of colors—so you can add a little (or a lot of) color to your typing if you feel like it.

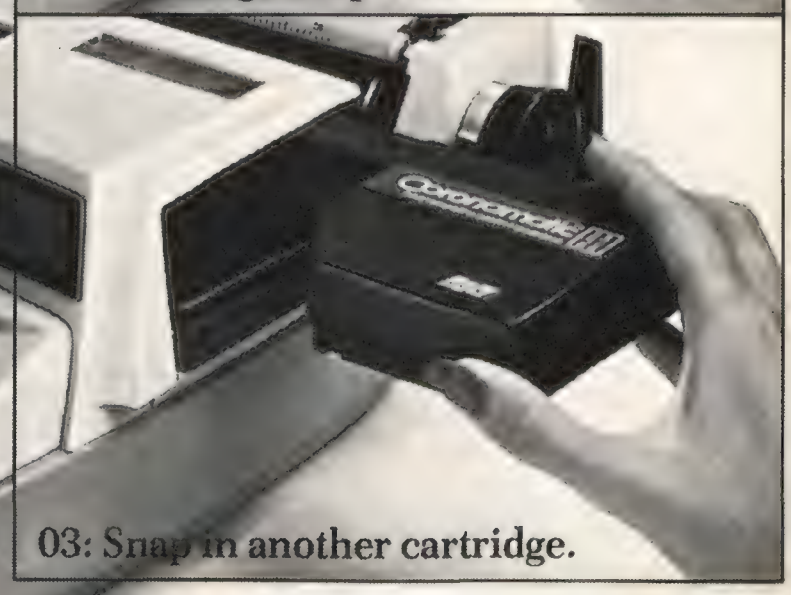
Smith-Corona's new cartridge ribbon typewriters.

Now that you know which electric portable to give, the question is who to give it to.

Or, better yet, who to get it from.

01: Press cartridge release.

02: Cartridge snaps out.



03: Snap in another cartridge.

SCM® SMITH-CORONA
SCM CORPORATION

For Men and Women

Goose Down Bootees for Frigid Tootsies

For instant old-fashioned fireplace warmth, just ease those chilly feet into the luxurious softness of Bauer Goose Down quilted in long-wearing Expedition Nylon. Soft leather soles. Insulating foam insole. Give shoe size and we will send a perfect fit. **Color:** Powder Blue for Women, Taupe for Men. Only **$14.95** postpaid. Makes a perfect Christmas Gift.

Order today! Money-back guarantee!

Enclosed is my check or money order for $_____. (Add sales tax where applicable.)

Please RUSH my Goose Down Bootees.

Men's 0146 Size_____

Women's 0149 Size_____

Name_____

Address_____

City_____

State_____ Zip_____

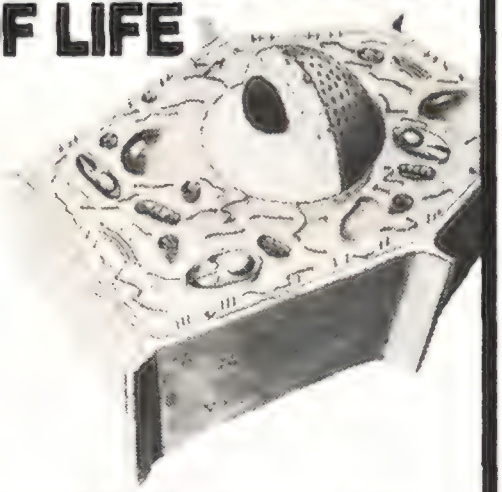
☐ Send me FREE your new color catalog of over 1000 exciting outdoor products.

Eddie Bauer®

Dept. DST Seattle, Wash. 98124

Ernest Borek, acclaimed for his achievements in both molecular biology and science writing, tells about: the truth behind the old wives' tale that children grow in their sleep; the hardy microbe that lives happily in nuclear reactors; the virus that beat Buckminster Fuller to an idea by several million years; the prospects for genetic engineering and human cloning....

ERNEST BOREK THE SCULPTURE OF LIFE



Hardcover $10.00, Paperback $2.95
At bookstores or from

COLUMBIA UNIVERSITY PRESS
136 South Broadway, Irvington, N.Y. 10533

never in a class with such leaders as Frank Borman, James McDivitt or Alan Shepard or with his own partner on the first moon landing, Neil Armstrong. He moved into the last slot in the Gemini program only because one of the two-man crews was killed before their mission. But he performed well, and astronaut boss Deke Slayton named him to one of the three-man crews which had a chance to make the first moon landing. At the time, *Apollo 12* seemed the likeliest vehicle, but one mission was canceled and *Apollo 11*'s number came up.

Colonel Aldrin doesn't reveal much about the space program that hasn't been told better and more accurately elsewhere. But he tells all about himself—his hepatitis, his hemorrhoids, his vasectomy (in 1958, when the operation was rare). His mental illness—if that's what ailed him—gets full treatment, and he reveals a history of suicide in his family. He provides clinical detail about his children's health problems, and even his wife Joan's toothache rates a mention. The family pet monkey died and their aged mongrel has an incurable disease. The divorcée jilts Buzz, and Joan tearfully takes him back.

The author lets it all hang out, in one of the most embarrassing confessionals since the recent television series "An American Family."

Aldrin's basic insecurity is laid bare in every chapter. He cried often. He was terrified, he says, at making a speech, but he laps up the applause. After his days of glory were ended, he could find "no possible way of setting a goal that would match the goals already achieved." What to do for an encore? The answer: write a confused, sloppy book.

Astonishingly, Aldrin says he didn't really want to be on the first moon landing; he would have preferred one of the more scientific flights. Nor did he care especially that NASA reversed the original plan which had him first to step on the moon. But his father, an Air Corps officer turned successful business executive, was "instantly angry and said he intended to do something about it." The senior Aldrin is still campaigning to get his son promoted to general officer, though Buzz has retired. The father, an associate of Billy Mitchell and Jimmy Doolittle, "had skirted the fringes of fame," says the famous son, who wonders now: "Could it be that it was a bit diffi-

Nikon wants you to see better

Nikon prism binoculars start with world-famous Nikon optics, made from Nikon optical glass. Lenses and prisms for right and left barrels are precisely matched and collimated, and the optical parallelism of both barrels is verified.

That's why with Nikon binoculars you enjoy brilliant, sharp, full-field viewing without strain or fatigue, even for long stretches. Now, find out how little more it costs to see better, longer. At Nikon camera dealers and selected optical departments. Write for literature Folio 18, Nikon Inc., Garden City, N.Y. 11530. Subsidiary/Ehrenreich Photo-Optical Industries, Inc.

(In Canada: Anglophoto Ltd., P.Q.)

Nikon Binoculars

cult for him to accept that my own goals had begun to exceed those he had set for me?" One is left with the impression that Buzz is striking at the heart of his problem, but he fails to pursue the subject.

He ends by saying that he wants to prove that depression is a common illness which can be cured. But he still goes to the psychiatrist who proclaimed him "rock solid in the head."

—Robert Sherrod

Author of *Tarawa,* reissued last month on the 30th anniversary of the battle

The Britannica Encyclopedia of American Art
(Simon and Schuster, $29.95)

Here is an outstanding reference guide that should prove useful to anyone interested in the visual arts. This comprehensive, one-volume book provides authoritative information on just about everything, from Colonial portrait painters to present-day conceptual art, and from tinsel painting and Tiffany glass to glass skyscrapers. The more than 1,100 entries cover not only painting, sculpture, architecture, folk art and the decorative arts, but also printmaking, photography and contemporary crafts. Among the 32 critics, scholars and curators who contributed the entries were two Smithsonian staff members, Paul Perrot (on glass) and J. Jefferson Miller II (on ceramics).

With more than 800 illustrations (nearly half of them in color), a brief but informative guide to public collections of art, a glossary and bibliography, the *Britannica Encyclopedia of American Art* is one of the better bargains in this year's crop of expensive art books.

—David Bourdon

Associate Editor, SMITHSONIAN

Picture Credits

Cover Nina Leen; 11 Duke University; 16, 17 Peter F. Copeland; 22 Dr. Robert Hill; 26-31 Jon Brenneis; 33 U. S. Department of Agriculture; 34-37 Helmut Wimmer; 38 Derek Bayes; 39 Fitzwilliam Museum, Cambridge; 40 Christie's; 41 The National Gallery, London; 43 The Norton Simon Foundation; 44 Derek Bayes; 45 The National Gallery, London; 48, 49 G. Etzel Pearcy; 50 Dr. Whitney Smith; 53, 54, 56 John Huehnergarth; 60-70 Yoichi Okamoto; 72, 74-78 Nina Leen; 80, 81 Mary Ripley; 82-84 Alice Tangerini; 86 S. Dillon Ripley; 86, 87 Mary Ripley; 88, 89 Deutsches Museum; 89-92, 94 Lotte Meitner-Graf; 96, 97 Fritz Goro; 116 James Flora.

MUSEUM DIRECTOR

Louisiana's newly organized governing citizens Museum Board is seeking a Director for the historic Cabildo and its seven companion properties located in New Orleans and belonging to the Louisiana State Museum. The responsibilities of this new position will include executive, administrative and operational duties. Operating income is in the million dollar range. Applicants must have minimum five years museum association including administrative experience, curatorial background and related academic degree. Enthusiastic five thousand member Friends group actively supports all endeavors. Write for brochure and submit resume, references and salary requirement to George R. Montgomery, Room 425, 124 Camp Street, New Orleans, Louisiana 70130 or Stanton M. Frazar, Hibernia National Bank in New Orleans, Post Office Box 61540, New Orleans, Louisiana 70161.

Singapore/ Bali Cruise

It's the most exotic new adventure in cruising. 14 days from Singapore throughout the islands of Indonesia to Bali and back. 8 ports in all. Ancient ports and secret ones, supremely gracious ports all somewhere over the rainbow from our own everyday world.

And all yours aboard a brand new ship as lovely as the places she'll take you to. She's the m.s. Prinsendam with pool and bars, nightclub, dance floors and impeccable service, no gratuities required. Her maiden voyage will sail Jan. 14, 1974, and she'll sail every other Monday thereafter.

See your travel agent or call Miss Martin, collect, at 212-620-5101. Or send in the coupon. The m.s. Prinsendam is registered in the Netherlands Antilles.

Holland America Cruises 117-PSB-C
Pier 40, N. River, New York, N.Y. 10014
Please rush me your free Singapore/Bali cruise brochure.
Name_____
Address_____
City_____
State_____ Zip_____

Holland America Cruises
We're Dutch and we want everything to be perfect.

ANCIENT GOLD

Authentic Pre-Columbian Gold "Huacas," Old Baule & Ashanti Fetish Masks & Gold Weights, very old Crosses dating back to the second century, Egyptian, Scythian Gold Ornaments, Jewish "Kame-ah" Amulets, reproduced with exquisite detail via the "Lost Wax" process in solid sterling silver and 14K gold.

Every item in our collection has been carefully researched & is accompanied by its fascinating background story. (Gallery open 10-4, Mon.-Fri.)

Send 50¢ for our catalog

artland "museo del oro"
120 West 44th St., N.Y., N.Y. 10036 212 582-3903

Smithsonian Index

Covering Volume III—April 1972-March 1973
$1.00 per copy.
Please write to
Smithsonian Magazine
A & I 1363
Smithsonian Institution
Washington, D.C. 20560

AFRICA

See Africa with the experts on a Four Winds escorted tour.

For more than 16 years our escorts have been guiding visitors from East to West Africa and from Central to South Africa.

The Great Game Parks

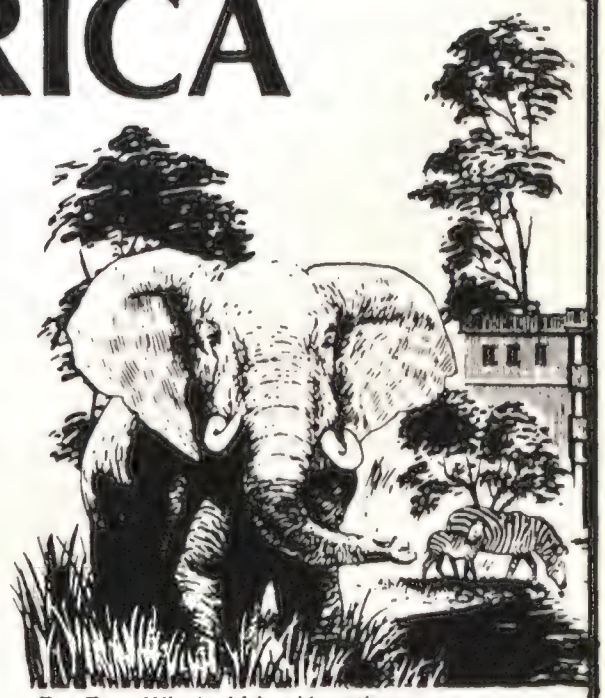
Four Winds takes you through Africa's greatest game parks. Live safari-style under magnificent African skies . . . game-watch from Treetops Hotel . . . thrill to the sight of enormous herds of wild game.

Travel in Comfort

You'll travel in superb comfort. By modern jetliner. In open-top minibuses in the game reserves-with window seats guaranteed to permit unobstructed viewing and photography. You stay at luxury hotels and famous game park lodges and dine at fine restaurants. Your all-inclusive rate covers meals, sightseeing, transfers, tips, baggage handling and land transportation, plus the services of your tour escort.

See Everything Worth Seeing

Choose from 7 great itineraries—each packed with the thrilling sights and sounds of Africa. From 16 to 37 days. Thrilling Amboseli Game Reserve... Tanzania's Ngorongoro Crater... legendary Khartoum... a Nile Cruise... fabled Ethiopia... the U.A.R.'s Great Pyramid and Sphinx... mysterious Casablanca.



For Four Winds Africa Vacations, see your travel agent or mail coupon.

Four Winds® A326
175 Fifth Ave., N.Y., N.Y. 10010
Phone: 212-777-0260

Please send me your 24-page full-color brochure describing your Africa vacations.

Name_____
Address_____
City_____ State_____ Zip_____

Travel the Smithsonian way

One of the benefits of being a Smithsonian Associate is the opportunity to participate in Foreign and Domestic Study Tours, led by Smithsonian Institution curators or other experts. These specialized, quality tours offer a combination of study, vacation, discovery and adventure to Associates and their families.

DOMESTIC STUDY TOURS

Christmas at the Smithsonian: Enjoy visits to the newest Smithsonian exhibits, a pre-opening look at the Hirshhorn Museum and Sculpture Garden (public opening in 1974) and the National Air and Space Museum's experimental Spacearium. Members will be invited to receptions, dinner with Smithsonian leaders, and an old-fashioned tree-trimming party attended by representatives of the diplomatic corps. Limited to 150 persons—December 7-9.

Hawaiian Islands: Visit five islands and examine the ancient petroglyphs; side trips include the Fern Grotto on Kauai, the Iao Valley on Maui and Sea Life Park on Oahu—January 17-31, 1974.

Old Sturbridge Village, Massachusetts: A nostalgic winter weekend of sleigh rides, singing, square dancing and delicious food—January 25-27, 1974.

Baja California: Observe the gray whales, seals and sea lions from San Diego to Scammon Lagoon—February 4-11, 1974 (waiting list only).

Mound Builders of Georgia: Trace the prehistoric mound-building cultures of Georgia by exploring undeveloped sites, archaeological excavations and museums—February 17-23, 1974.

Science Weekend at the Smithsonian: Join behind-the-scenes tours of exhibits led by Smithsonian curators and take a day-long field trip to the National Zoological Park, Chesapeake Bay Center for Environmental Studies or the Department of the Interior's Endangered Species Lab—March 22-24, 1974.

California Channel Islands: Study the notable bird and plant life of these islands—April 15-22, 1974.

San Antonio, Texas: Take part in a colorful, authentic Mexican fiesta—April 20-26, 1974.

FOREIGN STUDY TOURS

West Africa: Historic sites from Mali to Senegal—January 8-February 1, 1974.

India and Nepal: Emphasis on architecture and museums—January 22-February 15, 1974.

Sites of Civilization Cruise: From Rome to Athens, via Sicily, Malta, Tunisia, Egypt, Thera and Cyprus on the spacious yacht *Argonaut,* chartered especially for Smithsonian Associates—April 6-27, 1974.

Greece: Sites and flowers in northern Greece and the Peloponnesus—April 27-May 12, 1974.

Victorian Germany: Castles and palaces, including Prince Albert's birthplace at Rosenau—May 6-26, 1974.

Ethiopia and Kenya: Ancient and contemporary cultures from Aksum to Lalibela, plus several days in Kenya—May 24-June 14, 1974.

Black Sea Cruise: Depart and return Athens, via Turkey, Bulgaria, Romania and Russia—September 17-October 6, 1974.

Afghanistan and Pakistan: Archaeological and historical sites—October 21-November 11, 1974.

For detailed information on Domestic Tours, write Mrs. Diana Parker, Room SI 106; for Foreign Tour information, write Miss Bliss Schumann, Room SI 123, both at Smithsonian Institution, Washington, D.C. 20560.

Smithsonian highlights

Division of Performing Arts
"The Oberlin Baroque Ensemble" presents a concert of great style and imagination featuring viols, an authentic baroque violin, one-keyed flute and a harpsichord. Marin Marais' extraordinary "Opera for Instruments," *La Gamme,* is included in the program—December 7, 8:30 P.M., Hall of Musical Instruments, Museum of History and Technology.

"The Jazz Heritage Series" presents avant-garde composer and pianist Cecil Taylor performing his own works—December 16, 4:30 P.M. workshop, Hall of Musical Instruments, Museum of History and Technology; 8 P.M. concert, Baird Auditorium, Museum of Natural History.

"Theater Chamber Players at the Smithsonian," an ensemble of unique musicians, opens the chamber music season at the Smithsonian—December 17, 8:30 P.M., Baird Auditorium.

For information on the above events, call (202) 381-5395.

Renwick Gallery
The "Potomac English Handbell Ringers" present a holiday concert in the Grand Salon—December 11, 8 P.M. Tickets available at the Renwick Gallery information desk.

Smithsonian Museum Shops
The museum shops in the Arts and Industries Building and the History and Technology Building feature gifts and ornaments from around the world. Shops are open during regular museum hours—10 A.M. to 5:30 P.M. daily.

National Portrait Gallery
"President Monroe's Message: An Exhibition Commemorating the 150th Anniversary of the Monroe Doctrine" includes portraits of James Monroe, John Quincy Adams, Ferdinand VII, Simón Bolívar and other figures influential during the Monroe era—opens December 2.

National Air and Space Museum, Arts and Industries Building
"Wright Brothers' Wind Tunnel" commemorates the 70th anniversary of the Wright Brothers' first flight. It features a working reproduction of the wind tunnel and instrumentation used in their flight experiments—opens December 17.

"Air Traffic Control" is a continuing exhibit showing the growth of air traffic control in the United States. It includes a theater in which air traffic control procedures are demonstrated while viewers take a simulated flight from Pittsburgh to Washington, D.C., a re-creation of the first federal air traffic control center, and radar equipment.

National Collection of Fine Arts
"Modern American Woodcuts" is a continuing exhibition of the works of American artists Milton Avery, Carol Summers, Max Weber and Leonard Baskin.

"Robert Loftin Newman" is a continuing major exhibition of this 19th-century artist's small, hauntingly beautiful paintings. Many of the 80 paintings and 25 drawings depict Biblical subjects.

Puppet Theater
"Patchwork" is an original anthology of children's songs, poems and stories presented by Allan Stevens and Company. Performances are on Wednesdays, Thursdays and Fridays at 10:30 and 11:30 A.M., and on Saturdays and Sundays at 11 A.M., 12:30 and 2:30 P.M. in the Arts and Industries Building. For ticket information, call (202) 381-5395.

Smithsonian Commons
Luncheon facilities for Smithsonian Associates are in the original Smithsonian Building. Open Monday through Friday from 11:30 A.M. to 2 P.M., the Commons offers a buffet luncheon from $1.50 to $1.95. Also available are coffee and pastries from 10 to 11 A.M., and tea and pastries from 2:30 to 4:30 P.M.

THE CHRISTMAS MEAL AT JACK DANIEL'S has been the same since 1918.

In Jack Daniel Hollow it's always turkey, sweet potatoes and marshmallows, scalloped oysters, broccoli, hot biscuits, coconut cake with custard, and eat till you can't. To us, that's a very happy holiday. And we wish the same to our good friends everywhere.

CHARCOAL MELLOWED DROP BY DROP

Tennessee Whiskey • 90 Proof • Distilled and Bottled by Jack Daniel Distillery
Lem Motlow, Prop., Inc., Lynchburg (Pop. 361), Tennessee
Placed in the National Register of Historic Places by the United States Government.

Wanted: People willing to invest $1691 each in zebras, elephants and black-maned lions. (Photography permitted.)

For more information contact The Red Baron.

Price includes 18-day tour to Nairobi National Park, Ngorongoro Crater, Lake Manyara Reserve, Serengeti Game Reserve and other locations. A Lufthansa jet to and from Africa, deluxe accommodations, guides, local transportation and most meals will be provided. For this and other tours write for free prospectus. And remember, you can use your American Express Money Card to pay for your trip.

The Red Baron
Lufthansa German Airlines, Dept.
1640 Hempstead Tpke. SMSA1200
East Meadow, N.Y. 11554

Please send me your booklet "African Odyssey" (109) detailing all of your safari itineraries. I understand the price is based on round-trip GIT air fare, economy class, double occupancy.

Name_____

Address_____

City_____State_____

My Travel Agent is_____

Lufthansa German Airlines
Fly with The Baron.
He knows how to travel.

Museum of History and Technology

"Triumph over Disability: 200 Years of Physical Medicine in the United States" is a continuing exhibit showing the development of rehabilitative medicine in the United States. A modern hospital gymnasium, prosthetic limbs, pacemakers and mechanical hearts are included in the exhibit. Stories of famous Americans who have overcome physical disabilities are also featured.

"New Images 1839-1973," in the print gallery of the Hall of Photography, illustrates the revival by contemporary photographers of early photographic processes and techniques.

Contributing Memberships

Persons who contribute $50 or more annually to the Associates support the Institution's national educational programs and enjoy additional privileges. Graduated benefits include:

- Assistance in communicating with any part of the Smithsonian.
- Information on any museum in the world in advance of a visit there.
- Smithsonian annual report and other publications.
- Invitations (when in Washington) to exhibition previews and special events, including admission of a guest.
- Research service for questions about subjects related to the Smithsonian.
- A remembrance from the Smithsonian in the form of a commemorative object or work of art. Write: Contributing Membership, Smithsonian Associates, Smithsonian Institution, SI 118, Washington, D.C. 20560.

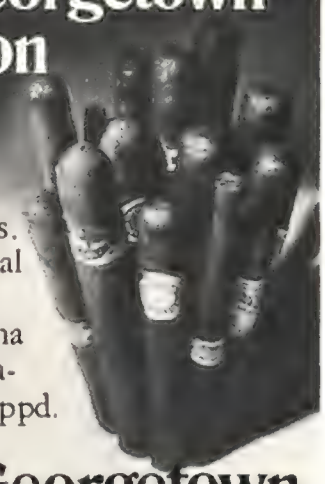
Museum of Natural History

"Tribal Costumes of Southern Africa" is a continuing exhibition of watercolors depicting costumes worn by 11 different tribes. Verda V. Peters and her daughter, Olemara Peters, have made four expeditions to South Africa and painted more than 800 pictures of this unique, traditional tribal dress.

Parking on the Mall

Metro construction has made parking on the Mall near the Smithsonian complex extremely difficult. All parking prior to 10 A.M. is restricted. The use of fringe parking areas and/or public transportation is recommended whenever possible.

the Georgetown Collection



A rare gift idea. 14 of the world's finest hand made cigars. Included are Royal Jamaica, Punch, Bances, Casa Buena and Suerdieck, among others. $10 ppd. Send check or m.o. Gift boxed, with card. Send 25¢ for catalog

Georgetown
TOBACCO & PIPE STORES
3144 M Street, N.W., Dept. S M
Washington, D.C. 20007

Smithsonian Binders

Magazines slip into case to become valuable reference volumes. Dark blue with gold lettering. One file holds 12 issues.

The Highsmith Co., Inc.
Box 25s
Fort Atkinson, Wis. 53538
One Smithsonian File $2.50
3 for $5.95. All postpaid

WRITE ITALIC

Learning the Italic hand is more exciting with the PLATIGNUM ITALIC SET containing a fountain pen, five Italic nibs and our free introductory manual. It allows you to discover which nib widths best suit your developing hand and offers the convenience of having full nib range available for special purpose work. Only $4.50 at artist material, pen and craft shops as well as college bookstores or send check or money order to PENTALIC CORPORATION, 132 W. 22nd STREET, NEW YORK, N.Y. 10011. Add 50 cents to cover handling. State whether right or left handed... Nothing is more satisfying than learning to produce the beautiful thicks and thins that characterize the Italic hand and it's easy to do as the pen, held at the proper angle, does most of the work for you. So be a complete penman, own the PLATIGNUM ITALIC SET.

Statement of ownership, management and circulation (Act of August 12, 1970: Section 3685, Title 39, United States Code) of Smithsonian published monthly at the Smithsonian Institution, 900 Jefferson Drive, Washington, D. C. 20560 for October 1, 1973. General business offices of the publisher are located at 900 Jefferson Drive, Washington, D. C. 20560. Name and address of publisher and editor is Edward K. Thompson, 900 Jefferson Drive, Washington, D. C. 20560. Owner is: Smithsonian Institution, 900 Jefferson Drive, Washington, D. C. 20560. Known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages or other securities: None. The purpose, function, and non-profit status of this organization and the exempt status for Federal income tax purposes have not changed during preceding 12 months (Section 132.122, Postal Manual). The average number of copies of each issue during the preceding 12 months are: (A) Total number of copies printed: 462,261; (B) Paid circulation: (1) Sales through dealers and carriers, street vendors and counter sales: 737; (2) Mail subscriptions: 446,020; (C) Total paid circulation: 446,757; (D) Free distribution by mail, carrier or other means: 7,685; (E) Total distribution: 454,442; (F) Office use, left-over, unaccounted, spoiled after printing: 7,819; (G) Total: 462,261. The actual number of copies of single issue published nearest to filing date are: (A) Total number of copies printed: 495,004; (B) Paid circulation: (1) Sales through dealers and carriers, street vendors and counter sales: 394; (2) Mail subscriptions: 483,609; (C) Total paid circulation: 484,003; (D) Free distribution by mail, carrier or other means: 6,911; (E) Total distribution: 490,914; (F) Office use, left-over, unaccounted, spoiled after printing: 4,090; (G) Total: 495,004. I certify that the statements made by me above are correct and complete.

(signed) Joseph J. Bonsignore
General Manager

"You have ruined my Volaille"

How Dione Lucas (of Cordon Bleu fame) came to create the most remarkable knife in the world. A knife you can now own.

Not an inexpensive knife.

I am told by my friends who pride their cooking, that this is just that—a remarkable knife that brings a new celebration to cooking. Its balance is such, its blade so acute, that with a small flick, you can pare fat from the shank of meat.

That, some remember, is exactly how gourmet great, Dione Lucas, came to create this remarkable knife.

Her recipe for Supreme de Volaille called for carefully removing all the fat from the tender meat.

A trace of fat would cause the sauce supreme to spot. "You have ruined my Volaille," she said. For no knife satisfied her with its truth of edge.

It is completely within the bounds of safety to say that once you own the Dione Lucas Gourmet Knife, you may never again have to purchase a knife for your kitchen.

In fact, that is the way we guarantee these remarkable knives. Should you ever need a replacement for any reason, simply return the knife, and a new knife will be sent to you, at no cost to you.

How can such confidence be placed in what would appear to be a simple knife?

A most special steel of molybdenum mix is used in the manufacture of the blade. This blade keeps its edge for life with simple honing.

Then there is the balance I spoke of. When you lift the knife, you will note it is lighter than an ordinary knife. This is because the knife is so perfectly balanced, that it does not need added weight to help it cut! This balance, in your hand, makes possible an accuracy of cut you have never before known. A certainty of cut quite unique in any cooking experience you may have had.

I make no pretense of low price for this knife. It is not, by any means, the world's most inexpensive knife set. Yet when you consider it as a lifetime investment, its value takes real meaning.

A set of 4 of these knives is $14.98.

Were it to be sold for less, the very qualities that make this knife so supreme, would have to be lessened.

And these knives have been subjected to extreme tests to assure their quality.

A one pound ball has been dropped on this from 6 feet to test the strength of the Rosewood handle.

A weight of 20 pounds was suspended on the blade to test its tensile strength.

A ham bone was used in extensive tests to determine the resistance of the blade to nicking.

In every case, the quality of this remarkable Dione Lucas knife stood firm.

There are four knives in the set. One of 8½" for vegetable paring. One of 11½" for the wafer thin slicing of bread and such. One of 14¼" for the carving of roasts. And a cleaver of 11" for the separation of chickens and such.

Because this is such a unique ownership, I am including with each set of these knives, four recipes of Cordon Bleu teacher, Dione Lucas, where the use of her knives is quite critical to the outcome of the recipe. (Including her recipe for Supreme de Volaille.)

Remember the truly unique guarantee: **You will never again need to purchase another kitchen knife once you own these.** Should you not be pleased when you see these knives, send them back and we will refund your money.

Save $5.00, regular price $19.98 . . . now $14.98.

DIONE LUCAS
GOURMET CENTERS
Westmoreland Ave., White Plains, N.Y. 10606

5271 A

MAIL NO-RISK COUPON TODAY

Dione Lucas Gourmet Centers, Dept. MSC-229
Westmoreland Ave., White Plains, New York 10606

Please send me_____sets of original Dione Lucas Gourmet Knives for only $14.98 plus $1.00 for postage and handling for each set of four. I understand I have a complete money-back guarantee if I am not delighted.

(New York State residents, add appropriate sales tax, please.)

I enclose ☐ check for $_____ ☐ money order for $_____

or charge my ☐ Master Charge ☐ BankAmericard ☐ American Express

Card Number_____ Exp. Date_____

Interbank # (Master Charge only)_____

Signature_____

Name (print clearly)_____

Address_____ Apt. #_____

City_____ State_____ Zip_____

.DIVISION OF BEVIS INDUSTRIES, INC.

Bean's *Outdoor Sporting Specialties*

Camp Boot

Our own make of genuine sheepskin with soft, fleecy wool inside. Sheepskin inner-sole, flexible cowhide outsole and non-slip rubber heel. Leather trim. The most popular item in camp or at home. Mens whole sizes 3 to 13. Price $16.50, postpaid.

☐ Send Free Catalog

Ship____Men's size____$16.50 postpaid

Name_____

Address_____

_____

Zip_____

L. L. Bean, Inc.

934 Main St., Freeport, Maine 04032

ANTIQUE ORDNANCE REPLICAS Miniature to full scale. Sizes suited to fireplace hearths, dens, lawns and parks, site restorations, and so forth. Authentic 18th and 19th century types. Well-illustrated catalog by first class mail, $2.00.

SOUTH BEND REPLICAS, INC.

61650 Oak Road South Bend, Ind. 46614

REVOLUTIONARY ERA TEAPOT

Handsome, colonial teapot of early American design. Rich mustard colour edged in copper lustre with the etching of the year 1650 on its side commemorating the establishment of the firm which exported those celebrated chests of tea sunk in the Boston Tea Party of 1773. Each teapot contains one-quarter pound packet of tea from Davison, Newman & Company which is still prospering after two and one-half centuries. A unique dining or kitchen piece for your home or for Christmas giving. Approx. 3½" high, 9"wide. $20.00 Ppd. Allow 2 to 3 weeks delivery.

Eclectic Gallery Ltd.

P.O. Box 9981-S
Chevy Chase, Maryland 20015

Museum Reference Service

The Smithsonian Associates' Museum Reference Service is available to members traveling within the United States. Associates may write for a packet comprised of lists, by state, of many of our country's museums, galleries and historical sites. Brochures are included when available. Please specify the states in which you will be traveling. Allow at least three weeks for mailing. Write: Smithsonian Associates' Reception Center, Smithsonian Institution, Washington, D.C. 20560.

Traveling Exhibition Service

There are up to 70 different Smithsonian-sponsored exhibitions on display each month throughout the United States and Canada. For a complete listing and information on how to bring an exhibit to your area, write: Traveling Exhibition Service, Smithsonian Institution, Washington, D.C. 20560.

- New York, New York—"Kurt Kranz" (New York Cultural Center, Dec. 1-30).
- Ottawa, Canada—"Building the London & Birmingham Railway" (National Museum of Science & Technology, Dec. 8-Jan. 6).
- Sault Sainte Marie, Michigan—"Contemporary American Drawings V" (Lake Superior State College, Dec. 15-Jan. 13).
- Boise, Idaho—"Manuscripts of the American Revolution" (Idaho State Historical Museum, Dec. 1-30).
- New Orleans, Louisiana—"Man in Sport (I)" (Hibernia National Bank, Dec. 15-Jan. 13).
- Charleston, South Carolina—"American Coverlets" (The Charleston Museum, Nov. 24-Dec. 23).
- Logan, Kansas—"Victorian Glass" (Dane G. Hansen Foundation, Dec. 22-Jan. 20).

Smithsonian Speakers

The National Speakers Bureau is a service provided by Smithsonian Associates which offers an opportunity for organizations within the United States to request curators and other Smithsonian Staff members to lecture on a wide spectrum of disciplines. Travel and other expenses are paid by participating organizations. Write: National Speakers Bureau, Smithsonian Associates, Smithsonian Institution, SI 118, Washington, D.C. 20560.

Good original art a beautiful investment

Pablo Picasso "Au Cirque" 1905

Rare original lithographs & etchings signed by Dali, Picasso, Carcan, Jansen, Moti, Peretz, Victoir and other important artists can be yours exclusively. Send today for free color brochure.

Original print collectors group, Ltd.

Dept. S-1 ,120 East 56th Street, New York, N.Y. 10022

Own land where your nearest neighbors are a white tail deer, a blue heron, and a family of chipmunks.

It may sound like a paradox, but one of the best ways to preserve the wilderness is for people like you to own it. It's true that we have sold 1000's of acres of primitive land in Idaho, Eastern Washington and Montana. And it's going fast. But conservation-minded people are our largest number of buyers. They take good care of their wooded acres and the natural beauty around them. Shouldn't you set aside some mountain or meadow land now for recreation, camping, a cabin? Maybe for retirement. Certainly as an investment. Consider a five to forty acre tract. As little as $2000. Terms available. View sites and waterfront available. Guaranteed road access, warranty deed and title insurance. Come on vacation and see for yourself, or write first for free lists of sites, maps and complete information. Dept. D35, Reforestation, Inc., P.O. Box 14006, Opportunity Station, Spokane, Washington 99214.

ATTENTION INVESTORS:
Larger tracts available at "wholesale" prices. When writing, specify if you are interested in more than 40 acres.

North Cape-Mediterranean-South America-South Pacific-the World-on Holland America.

Three luxurious new Holland America cruise ships: s.s. Volendam, s.s. Veendam and s.s. Prinsendam.

All three offer you a million-dollar Lido Deck, with poolside restaurant that lets you stroll from a dip direct to luncheon without dressing. Spacious cabins, 90 percent facing sea. And the nicest crews in cruising, with no gratuities required. Bridge taught by people taught by Goren on the Veendam and Volendam. Free transportation from La Guardia airport to Pier 40 on day of New York sailings.

Jan. 7, 1974

A historic cruise: the maiden voyage of the s.s. Volendam through the South Pacific and Around South America. 75 days, 28 ports including Pago Pago, Papeete, Pitcairn Island, Montevideo, and for only $450 per person more, a nine-day overland tour of Australia and New Zealand with no extra charge for airfare. From New York. From Pt. Everglades Jan. 9, $4145 to $11,125.

Jan. 19

Sail around the world with Captain Lagaay on the maiden World Cruise of the s.s. Veendam. 88 days, 18 ports, including Rio de Janeiro, Capetown, Bombay, Singapore, Hong Kong, Yokohama, Honolulu, and for the first time, Pusan, Korea. From New York. From Pt. Everglades Jan. 21. $5105 to $17,600.

Mar. 28

Take a fresh look at the Mediterranean on the Grand Spring Cruise of the s.s. Volendam. 49 days, 29 ports, including Casablanca, Tangier, Izmir, Istanbul, Mykonos, Athens, Brindisi, Cannes, Lisbon. From New York. From Pt. Everglades Mar. 30. $2660 to $5960.

May 23

Sail in genuine luxury on the Spring Mediterranean Cruise of the s.s. Veendam. 35 days, 21 ports, including Funchal, Gibraltar, Naples, Portofino, Cannes, Monte Carlo, Barcelona, Malaga, Lisbon. From New York. From Pt. Everglades May 20. $1875 to $4210.

June 7 July 19

Choose any of two sailings to the North Cape, Scandinavia and Russia, on a cruise that sails from glaciers to palm trees. 41 days, 25 ports, including Reykjavik, Oslo, Stockholm, Helsinki, Leningrad, Copenhagen, Rotterdam, Torquay and Horta. Land excursions available to Moscow, Paris and other cities. $2295 to $5130. From New York aboard the s.s. Volendam. From Ft. Lauderdale June 4.

Aug. 30

New corners of the Mediterranean: Western Mediterranean Discovery Cruise with the s.s. Volendam. 35 days, 25 ports, including Ponta Delgada, Tangier, Valletta, Monte Carlo, Barcelona, Funchal. From New York $1760 to $3955.

Oct. 5

Sail off the beaten track aboard the s.s. Volendam's Mediterranean Explorer's Cruise. 41 days, 22 ports, including Casablanca, Mahon, Monte Carlo, Mykonos, Izmir, Rhodes, Motril, Tangier. From New York. From Pt. Everglades Oct. 7. $2225 to $4980.

Starting Jan. 14, 1974

New. Exciting. Different. Indonesia cruises through the exotic East Indies from Singapore to Bali aboard the new m.s. Prinsendam. Every two weeks, 14 days, 8 ports including Penang, Djakarta, Bali, Semarang. Exciting new ship, too: fabulous new Lido Deck with flagstone terrace around the pool, 90 percent of its cabins facing the sea. $780 to $1340.

Rates per person, double occupancy, subject to availability. All ships registered in the Netherlands Antilles.

See your travel agent or phone Miss Martin collect at (212) 620-5101, or clip the coupon.

You may charge your cruise on American Express, BankAmericard or Master Charge.

Holland America Cruises, Pier 40 North River, New York, N.Y. 10014

Gentlemen: Please send me free color brochures on the cruises I've listed below.

☐ Enclosed is my check for $9.95 for "A Bridge to the Seven Seas," a fully illustrated book about 100 years of Holland America history.

☐ Send me information on "A Bridge to the Seven Seas."

Name_____

Address_____

City_____ State_____ Zip_____

Travel Agent_____

We're Dutch and we want everything to be perfect.

HOLLAND AMERICA 1873 1973 CENTENNIAL

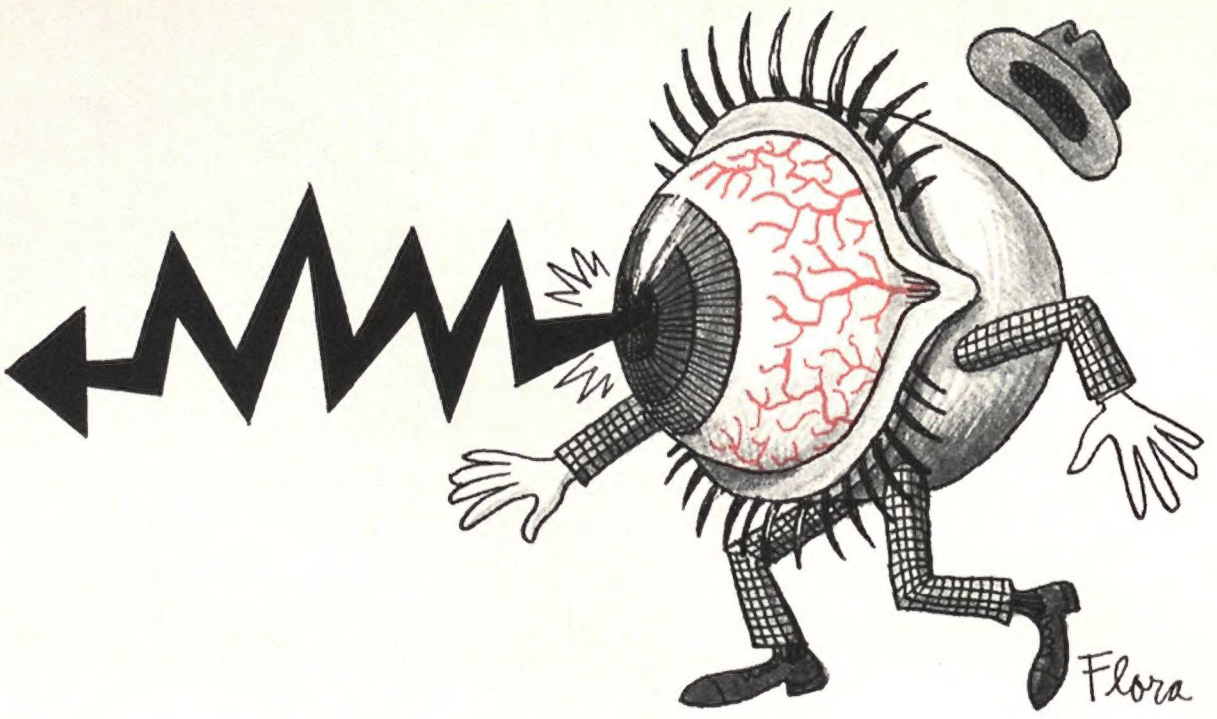
Holland America Cruises

CELEBRATING A CENTURY OF LUXURY SERVICE.

117-LCC-C

By Patrick Ryan

An evil eye turneth away a left hook?



Back in the days of bare-knuckled bruisers, the best man won simply because he was bigger, braver or fortunately endowed with a granite skull. Today the athletic arena is also a psychological cockpit. From Sicily comes a report that Signor Salvatore Caizzone, "the Magician of Peloro," has offered, for sufficient lire, to "lift the evil eye which four years ago made Messina [soccer club] sink into the third division." While over on the Italian mainland—conscious perhaps of the proximity of the Vatican—the Milan A.C., another soccer club, has retained a Franciscan father as spiritual adviser, thus hoping to divert any available divine intervention toward their victory. But the opposing religious adviser retained by the Lazio soccer club of Rome took the precaution of saying a special Mass on behalf of his team when they were playing Milan —with the result that Lazio beat the pride of Lombardy.

In Washington, D.C., the Redskins, titans of the National Football League, maintain a similar inspirer in the person of one Tom Skinner. Before each game he leads the hulking players in "vespers." The results, as any Washingtonian makes belligerently clear, have been generally spectacular.

In Africa, the Kenya Football Association has been investigating reports that witchcraft is being used in soccer matches. Apparently an embittered losing team charged that a spell cast on the opposing goalkeeper's cap prevented them from kicking the ball past him. And in a recent letter, Shariff Abubakar Omar, a leading Nairobi witch doctor, offered Sir Alf Ramsey, England's team manager, his professional services to insure that the Anglo-Saxons will win the World Cup competition in Germany in 1974.

The belief that certain among us can blight the crops, derail the love life or unhinge the sporting luck of our fellows has held sway since the first naked ape leered at his neighbor. Greek mythology carried on the cult with the three Gorgons who turned to stone those on whom they looked. P. G. Wodehouse may have encountered one of their latter-day descendants when he wrote, in *The Code of the Woosters,* of a "big chap with a small moustache and the sort of eye that can open an oyster at sixty paces."

The Emerson observation that "an eye can threaten like a loaded and leveled gun" has not gone unregarded in the fight game. François Descamps, manager of the elegant light heavyweight of the Twenties, Georges Carpentier, was credited with the ability to soften up his *garçon*'s opponents by the application of his hypnotic eye. Mohammed Ali has more recently tried optical tactics by giving his contender that menacing stare.

The most famous fight psycher was Ben ("Evil Eye") Finkel, who would sell his services to a fight manager, then sit at ringside and put the whammy on the opposing fighter. He was the inspiration for cartoonist Al Capp's Evil Eye Fleegle. When jilted by his girl friend, Evil Eye put a whammy on the sun, turned his eyeballs inside out and petrified himself.

In track athletics, where the rules mainly require that competitors start off side by side, it is not easy to cow an adversary by pupil-power. But America's new spider-legged sprinter, Steve Williams, seemed to apply the eye at this year's U.S.-Russian meet at Minsk. He turned to give Valeri Borzov two long, hard looks as he high-stepped it past the Olympic gold medalist.

He has lately been followed in vaster endeavor but meager achievement by Bobby Riggs, who encouraged downtrodden husbands to dreams of marital mutiny by proclaiming before being slaughtered by Billie Jean King, "I'm psyching her out already. She won't admit it but I can see her coming apart at the seams."

It is now a matter of history as to just whose joints finally fell apart, but students of the sporting occult still wonder why the acknowledged American guru of gamesmanship should suddenly have become incapable of hitting his first service with either venom or accuracy. Who was actually putting the cross-court whammy on whom? Did Billie Jean King land a left hook for Women's Lib by demonstrating that, in addition to being better at tennis, she also possessed the eviler eye?

Perhaps the promoter will hustle up another Libber for the lobber. If he does, Bobby Riggs might be well-advised to recall the careful Perseus and equip himself with winged sneakers, a toupee guaranteeing invisibility and a reverend spiritual adviser making set-point libations to Hermes and Athena.

We'd like you to know

What we found in this Florida peanut field wasn't peanuts.

Up until 1970, Jay was a small, peaceful city on the Florida Panhandle where peanuts, soybeans and cotton were grown.

Visit Jay today and you'd still see a small, peaceful city on the Florida Panhandle where peanuts, soybeans and cotton are grown. Plus some new things which you wouldn't see unless you searched for them. Oil wells.

The Jay Field, which extends into southern Alabama, is the biggest oil discovery on the U.S. mainland in more than ten years. And it's now good for more than a billion gallons of oil a year.

The important story about Jay is not just the oil field. It's how an oil

field can fit into a quiet farming community without turning it upside down.

Before the field became operational, Exxon and other oil companies commissioned an extensive study of the existing environment around Jay. The quality of the water, the land and the air were all measured and evaluated. Today, Exxon uses these measurements as a guideline in the operation of all their Jay facilities.

We think this is a good example of how the oil industry can coexist with a rural environment. Because the oil from this field is needed to help meet the energy needs in America. And we're proving we can get it without messing up a way of life in Jay.

EXXON

Imported from England by Kobrand, N.Y., 94 Proof, 100% Grain Neutral Spirits

Now is the time to stop and think of those things you've heard people asking for all year long.